

AD-A239 334



(2)

CULTURAL RESOURCES SERIES



**US Army Corps
of Engineers**

New Orleans District

Report Number: COELMN/PD-90/05

A CULTURAL RESOURCES SURVEY OF
THE BELLE RIVER BORROW AREA,
ST. MARTIN PARISH, LOUISIANA

DTIC
SELECTED
AUG 08 1991
S B D

FINAL REPORT

March 1990

MUSEUM OF GEOSCIENCE
Louisiana State University
Baton Rouge

DISTRIBUTION STATEMENT A

Approved for public release;
Distribution Unlimited

Prepared for

U.S. Army Corps of Engineers

New Orleans District

P.O. Box 60267

New Orleans, LA 70160-0267

91-06969



91-06969

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified			1b. RESTRICTIVE MARKINGS										
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT Unlimited										
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE													
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			5. MONITORING ORGANIZATION REPORT NUMBER(S) COELMN/PD-90/05										
6a. NAME OF PERFORMING ORGANIZATION Museum of Geoscience Louisiana State University		6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION New Orleans District U.S. Army Corps of Engineers										
6c. ADDRESS (City, State, and ZIP Code) P.O. Box 16002 Baton Rouge, LA 70893-6002			7b. ADDRESS (City, State, and ZIP Code) P.O. Box 60267 New Orleans, LA 70160-0267										
8a. NAME OF FUNDING/SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER DACW29-88-D-0123, Delivery Order 010										
8c. ADDRESS (City, State, and ZIP Code)			10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. PROJECT NO. TASK NO. WORK UNIT ACCESSION NO. N.A. Civil Works Funding										
11. TITLE (Include Security Classification) CULTURAL RESOURCES SURVEY OF THE BELLE RIVER BORROW AREA, ST. MARTIN PARISH, LOUISIANA													
12. PERSONAL AUTHOR(S) Ann Whitmer; Brady Banta; and Joann Mossa													
13a. TYPE OF REPORT Final	13b. TIME COVERED FROM <u>8/13/89</u> TO <u>10/15/89</u>		14. DATE OF REPORT (Year, Month, Day) <u>90/1/15</u>	15. PAGE COUNT 52									
16. SUPPLEMENTARY NOTATION													
17. COSATI CODES <table border="1"><tr><th>FIELD</th><th>GROUP</th><th>SUB-GROUP</th></tr><tr><td>05</td><td>06</td><td></td></tr><tr><td></td><td></td><td></td></tr></table>		FIELD	GROUP	SUB-GROUP	05	06					18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number) Archaeology, Cultural Resources, Shell Middens St. Martin Parish, Atchafalaya Basin		
FIELD	GROUP	SUB-GROUP											
05	06												
19. ABSTRACT (Continue on reverse if necessary and identify by block number) This report describes a cultural resources survey of a proposed borrow area along the Belle River in lower St. Martin Parish, Louisiana. The area surveyed was, in general, profoundly disturbed by previous construction activity. Three possible cultural resources were located along the Belle River in the survey corridor; these are tentatively identified as components of a previously identified site, 16 SM 42. Opposition from the land tenant prevented subsurface testing of these locations. An additional prehistoric site, 16 SM 43, was located immediately outside of the survey area. Although testing was conducted here, no bone or artifacts were recovered. Neither site, 16 SM 42 or 16 SM 43, will be negatively impacted by the proposed borrowing activities. At this time, neither site is eligible for placement on the National Register.													
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION Unclassified										
22a. NAME OF RESPONSIBLE INDIVIDUAL Michael Stout			22b. TELEPHONE (Include Area Code) <u>504-862-2554</u>	22c. OFFICE SYMBOL <u>COELMN-PD-RA</u>									



DEPARTMENT OF THE ARMY

NEW ORLEANS DISTRICT, CORPS OF ENGINEERS

P.O. BOX 60267

NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF:

December 21, 1989

Planning Division
Environmental Analysis Branch

To The Reader,

This cultural resources effort was designed, funded, and guided by the U.S. Army Corps of Engineers, New Orleans District as part of our cultural resources management program. The effort documented in this report was a cultural resources survey of the Belle River Borrow Area, a feature of the East Atchafalaya Basin Protection Levee.

We concur with the Contractor's conclusion that no significant cultural resources will be affected by use of the borrow area.

Michael E. Stout
Authorized Representative
of the Contracting Officer

Robert A. Bruison
R. H. Schroeder, Jr.
Chief, Planning Division

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification _____	
By _____	
Distribution _____	
Availability Codes _____	
Dist	Avail and/or Special
A-1	

A CULTURAL RESOURCES SURVEY OF THE BELLE RIVER BORROW AREA,
ST. MARTIN PARISH, LOUISIANA

Prepared for
The U. S. Army Corps of Engineers
New Orleans District

Prepared by
The Louisiana State University
Museum of Geoscience
Baton Rouge, LA

Authored by
Ann M. Whitmer
(with contributions by Joann Mossa and Brady Banta)

Malcolm Shuman, Ph.D.
Principal Investigator

TABLE OF CONTENTS

LETTER TO READERS.....	1
LIST OF FIGURES.....	4
ACKNOWLEDGEMENTS.....	5
Chapter 1. INTRODUCTION.....	6
Chapter 2. GEOLOGY AND GEOMORPHOLOGY OF THE BELLE RIVER BORROW AREA, ST. MARTIN PARISH, LOUISIANA.....	8
Introduction.....	8
Geomorphology and Geology of the Proposed Project Area.....	8
Geomorphic Changes Affecting the Proposed Project Area.....	14
Estimates of Global and Local Sea Level Rise.....	16
Relationships of Geomorphology with Human Settlement and Resources.....	18
Chapter 3. DESCRIPTION OF THE AREA.....	20
Floral Communities.....	22
Faunal Communities.....	23
Chapter 4. PREHISTORY OF THE LOWER MISSISSIPPI VALLEY.....	25
Prehistory of the Atchafalaya.....	29
Chapter 5. HISTORY OF ST. MARTIN PARISH.....	33
Land Titles and Chain of Title.....	37
Chapter 6. CULTURAL RESOURCES SURVEY.....	39
Chapter 7. SUMMARY AND CONCLUSIONS.....	48
REFERENCES CITED.....	49

LIST OF FIGURES

1.	Location of Project Area.....	7
2.	Geologic Cross Section near Project Area Showing Backswamp and Lake Environments.....	10
3.	Holocene Delta Complexes of the Mississippi River Delta Plain.....	11
4.	Flow through Old River as a Percent of Mississippi River Flow.....	13
5.	Geological Development of the Old River Region.....	15
6.	Plan Map of the Project Area.....	21
7.	Plan Map of Surveyed Area.....	40
8.	Plan Map of Cultural Resources.....	43
9.	Photo of 16 SM 43.....	45
10.	Contour Map of 16 SM 43.....	46

ACKNOWLEDGEMENTS

Joann Mossa wrote the section on geology. Brady Banta authored the historical section. The assistance of the many others who helped throughout this project, both in the field and in the Museum office, was invaluable. All of their efforts are greatly appreciated.

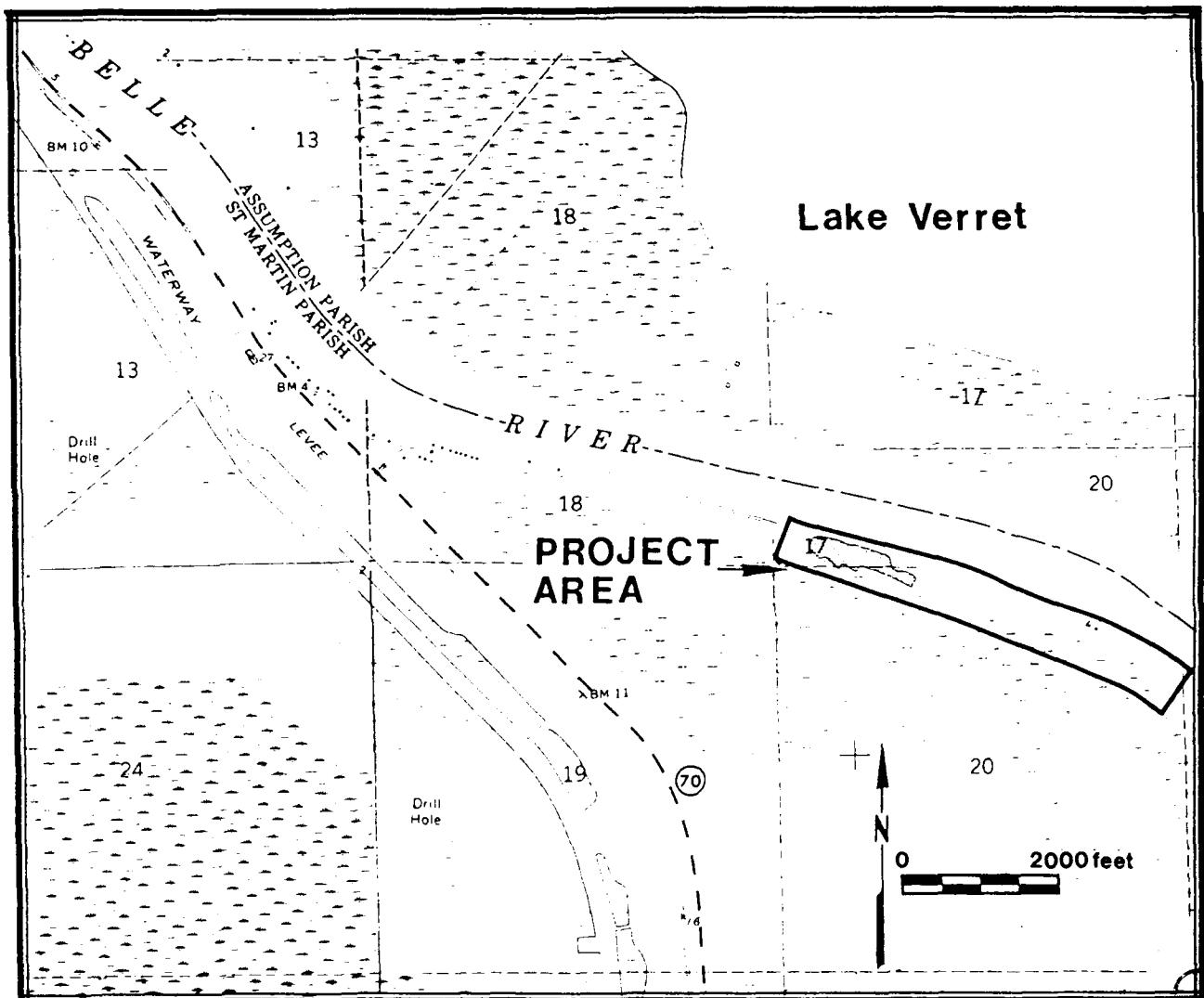
Chapter 1. INTRODUCTION

The following is a report on the cultural resources of the Belle River Borrow Area. The investigations were conducted between August and October of 1989 by the Museum of Geoscience for the U. S. Army Corps of Engineers, New Orleans District (Contract No. DACW29-88-D-0123).

The survey area is a narrow strip of land (approximately 5500 by 450 feet) on the west bank of the Belle River, southern St. Martin Parish, Louisiana. Located approximately 15 miles north of Morgan City, Louisiana and less than one mile east of the Intracoastal Waterway (Alternate Route), the area is just above the confluence of the Belle River and Bayou Magazille. It encompasses a triangular parcel in Section 17, a portion of the northern quarter of Section 20 and a fraction of Section 21 of Township 14 S, Range 13 E (Figure 1).

Included in the following report is a description of the area's geology and geomorphology, biota, historic and prehistoric settlements, and cultural resources.

Figure 1. Location of Project Area



Chapter 2. GEOLOGY AND GEOMORPHOLOGY
OF THE BELLE RIVER BORROW AREA ST. MARTIN PARISH, LOUISIANA

Joann Mossa

Introduction

This chapter concerns geomorphic aspects of the Belle River borrow area, located in St. Martin Parish, Louisiana. Since human settlement and resource utilization are related to landform distribution and geomorphic processes, the regional and site geology and geomorphology of this area forms an important component for more detailed assessments of the archaeology and cultural resources of the proposed project area. Geomorphology can assist cultural resources investigations as follows: 1) by defining and delineating the major landform units or geomorphic features of the project area; and 2) by reconstructing the geomorphic development of the study area such that inferences can be made regarding landscape changes, along with changes in accretion and erosion or subsidence and sedimentation in the vicinity of the project area. These both in turn are important for locating undocumented archeological sites and the current condition and location of previously documented sites.

The proposed project area is a 57 acre area with a corridor 450 ft wide and extending for 5500 ft. It is located adjacent and east of the East Atchafalaya Basin Protection Levee (EABPL) immediately southwest of Lake Verret along a meander bend beginning where Belle River turns east from the artificial levee and ending at the junction with Bayou Magazille. The proposed project area consists principally of alluvial backswamp and lacustrine deposition from these active distributaries of the Atchafalaya river system since the 1500s to the 1930s. This area was closed off from receiving substantial additional sediment from the Atchafalaya river system in the 1930s after levee construction authorized with passage of the Flood Control Act of 1928.

Geomorphology and Geology of the Proposed Project Area

The geologic history of the proposed project area has been strongly influenced by sea level fluctuations in the Gulf of Mexico and the shifting of the Mississippi River and its distributaries. Sea level fluctuations influenced the slopes, and therefore the load and channel characteristics, of rivers draining into the oceans. During lowering of sea level, the streams cut deep trench-like valleys; during the succeeding rising sea level, these valleys were alluviated. When sea level was approximately 300 ft (90 m) below present, during the Wisconsinan or latest Pleistocene deglaciation, the Mississippi valley became deeply incised within coastal plain sediments (Fisk 1944). During the glacial maximum, between 20,000 and 17,000 years before present, the Mississippi River a few hundred miles north of the proposed project area had a braided pattern; a braided stream regime may have persisted as far south as the Gulf coast, but this has not been established with certainty (Saucier 1974).

Sea level began to rise after the glacial maximum, and the alluvial sequence shows an upward decrease in particle size, resulting, in part, from the progressive decrease in slope brought about from rising sea level and

consequent filling of the valley. The deposits provide evidence of a gradational reduction in the carrying capacity of the master stream, according to Fisk (1947), and they reflect a great wave of alluviation which slowly spread upstream. Approximately 115 ft (35 m) of overbank clays and silts overlie an undifferentiated sand and gravel unit of late Pleistocene age (Smith et al. 1986). Depending upon the location within the basin, substratum sands and gravels vary in thickness from approximately 150 ft (46 m) north of the project area to more than 350 ft (107 m) south of the proposed project area. The clays of the Holocene section are divisible into a stack of alternating poorly-drained swamp, well-drained swamp, and lacustrine facies (Figure 2) (Coleman 1966; Krinitzsky and Smith 1969).

Since sea level reached its present stand, approximately 5000 years ago, there has been little effective change in valley slope and no apparent change in the size of particles carried by the lower Mississippi River (Fisk 1947). Deltaic development of the Holocene Mississippi River began when sea level rise began to slow. The delta plain consists of six major partially-overlapping Holocene delta complexes, each initially experiencing a constructive phase and then undergoing a destructive phase.

Some evidence indicates that older complexes and lobes are also buried by these six younger delta complexes. Four of these complexes, namely, the Maringouin, Teche, St. Bernard, Lafourche, are in various stages of deterioration, the Modern is principally experiencing deterioration with local areas of progradation, and the Atchafalaya is actively prograding or outbuilding (Figure 3). Each major course or belt of the Mississippi River, which shifted to a channel with a steeper gradient every 1000 to 1500 years during the Holocene, is associated with a delta complex (Saucier 1974). The early Holocene meander belts of the Mississippi River occupied courses in the western portion of the delta plain, and later meander belts have occupied courses in the eastern part of the delta plain; the Atchafalaya however is now located in the western part of the delta plain. The individual lobes within each complex are the products of distributary networks (Frazier 1967). The delta plain is characterized by elevations near sea level, by lakes and lake systems, by active and ancient distributary channels of the river, by numerous tidal bayous, and by numerous islands. Abandoned distributaries in the Atchafalaya basin backswamp generally trend in only three directions including southeast, southwest, and west (Smith et al. 1986). Southeast-trending distributary channels are believed to be associated primarily with the prehistoric, historic, and recent development of the Atchafalaya River. Southwest and westerly trending distributary channels are believed to be related to five major former Mississippi River distributaries which are related to the Teche and Lafourche delta complexes: Bayou Latenache, Bayou Fordoche, Bayou Blue and Grosse Tete, Bayou Plaquemine, and Bayou Corne. Of these, only Bayou Corne which was a distributary of Bayou Lafourche, passed in the vicinity of the project area. Distributary abandonment is a progressive process, whereby the base of the channel becomes filled with poorly sorted sands and silts containing an abundance of organic debris, which further reduces velocities causing deposition of clay, organic ooze, and peats.

Figure 2. Geologic cross section near the project area showing backswamp and lake environments (from Smith et al. 1986, after Krinitsky and Smith 1969).

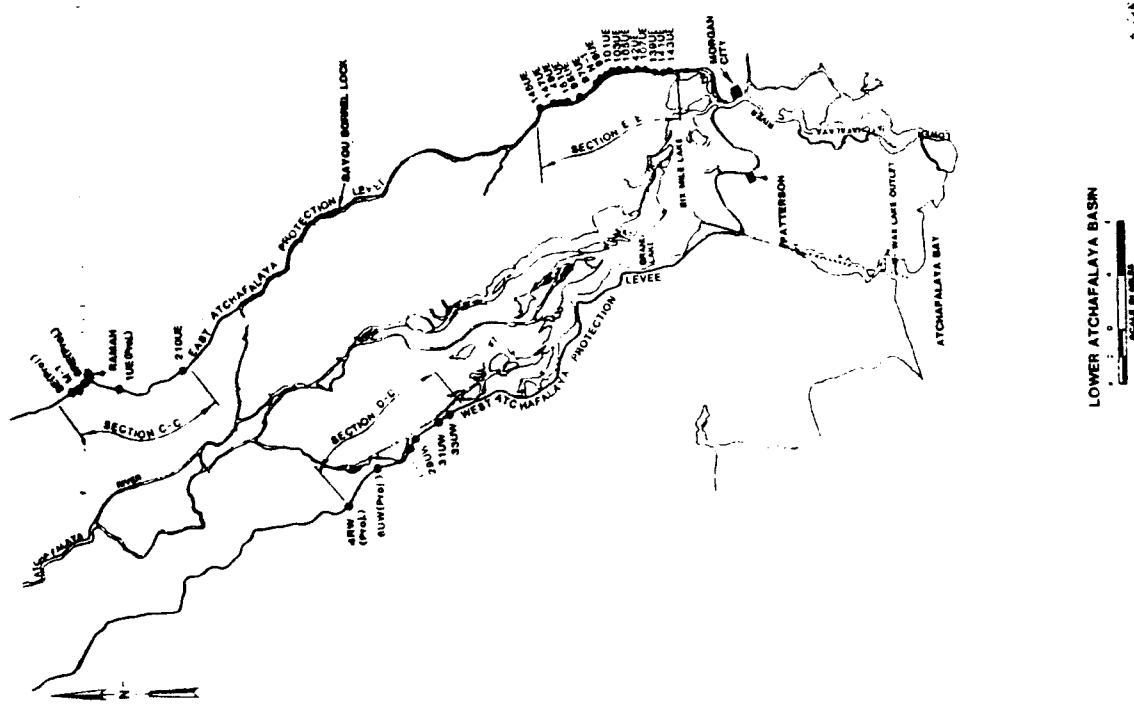
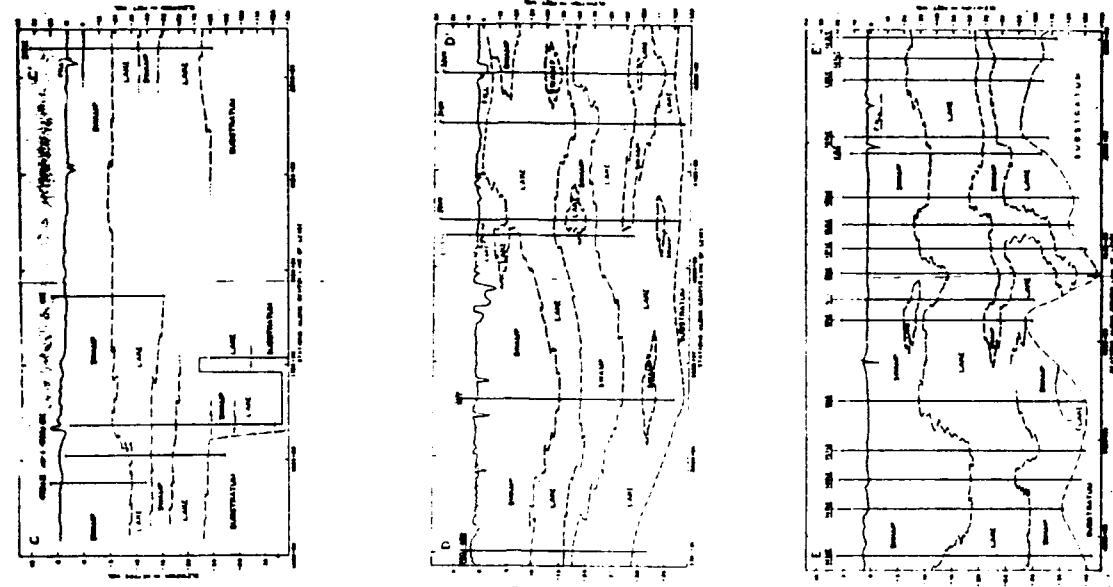
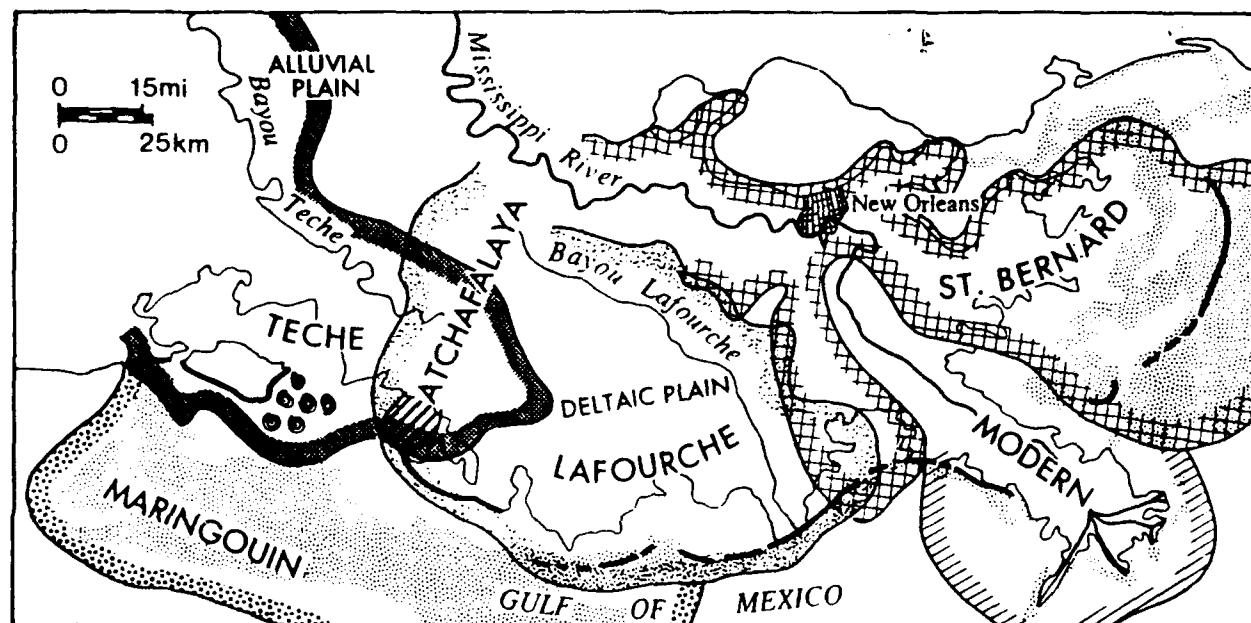


Figure 3. Holocene delta complexes of the Mississippi River delta plain (after Frazier 1967).



KEY

- ● ● Shell Reef
- Barrier Shoreline
- [] Sand

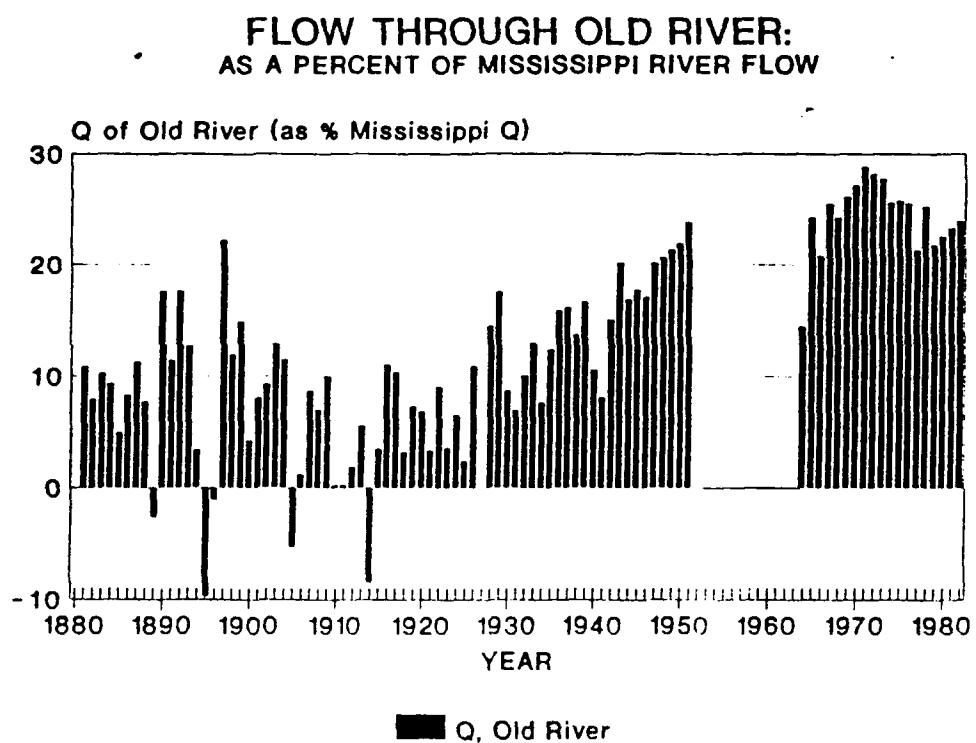
DELTA COMPLEX	AGE (YEARS BP)
Maringouin	7250-6200
Teche	5700-3900
St. Bernard	4600-1800
Lafourche	3500-400
Modern	Active
Atchafalaya	Active

The Atchafalaya basin initially received sediment principally from the Red River system and since the mid-1800s has experienced increasing flow from the Mississippi River system through Old River (Figure 4). Thus, alluvial sediments in the project area include contributions from both the Red River and Mississippi River sources. The Red River contains less smectite and more micaceous clay in the clay-sized fraction and does contain calcium carbonate at the time of deposition (USDA 1982). The Red River alluvium has a reddish color attributed to oxides of iron associated principally with the clay-size fraction. Reddish Permian age formations exposed in the western parts of the drainage basin in Oklahoma and Texas are the major source of this sediment (Brown et al. 1970). These sediments seem to resist color changes even though they have developed in a climate of alternate periods of saturation to the surface and drying when the water table fell to depths below the soil. Mineralogical studies of the Mississippi River alluvium indicate that smectite minerals are predominant in the clay-size fraction, with secondary amounts of micaceous clays (Brown et al. 1970). Associated with these are lesser amounts of kaolinite, chlorite-vermiculite intergrade, and quartz minerals. The sand and silt-sized fractions are made up largely of quartz with a sizeable component of feldspars and weatherable minerals including biotite and hornblende. Mississippi River sediment also does not have detectable quantities of calcium carbonate when it is deposited.

Geomorphic features and depositional environments in the vicinity of the proposed project area include natural levees, point bars, abandoned channels, abandoned courses, distributary channels, lacustrine and lacustrine deltas, lacustrine delta channels, backswamp, inland swamps and marsh. Both Belle River and Bayou Magazille are active distributaries. The principal environments of deposition in the project area are backswamp and shallow lacustrine, separated by lesser amounts of natural levee and channel deposition in localized distributary channels. These Holocene deposits may extend as deep as 200 to 350 ft, increasing from west to east from the EABPL to the south-central shore of Lake Verret.

The principal soil map unit in the project area is the Fausse-Sharkey association (USDA 1977). These soils occur in large tracts of swamp throughout the alluvial plain outside the Atchafalaya Basin Floodway. These soils are formed in clayey alluvium where slopes are less than 0.25 percent and elevations range from 1 foot below sea level to 10 ft above sea level. Though protected from flooding by the EABPL, the soils are flooded most of the time by runoff from higher areas. The Fausse series are very poorly-drained Typic Fluvaquents with very fine textures (>60% clay) and montmorillonitic mineralogy, with more than half of the clay fraction by weight being made up of expanding-lattice clays. The Sharkey soils are poorly drained Vertic Haplaquepts with very fine textures (>60% clay) and montmorillonitic mineralogy, with more than half of the clay fraction by weight being made up of expanding-lattice clays. In St. Martin Parish, the Fausse-Sharkey map unit consists of about 70% Fausse soils. Sharkey soils, spoil deposits, and soils that are similar to Fausse soils but have semifluid underlying layers make up most of the rest. The Sharkey soils are in higher area adjacent to major bayous and on low ridges inside the swamp. The spoil deposits are from dredging. The soils similar to Fausse soils that have semifluid underlying layers are in old lake areas at the lowest elevation within the swamp.

Figure 4. Flow through Old River as a percent of Mississippi River flow.



Geomorphic Changes Affecting the Proposed Project Area

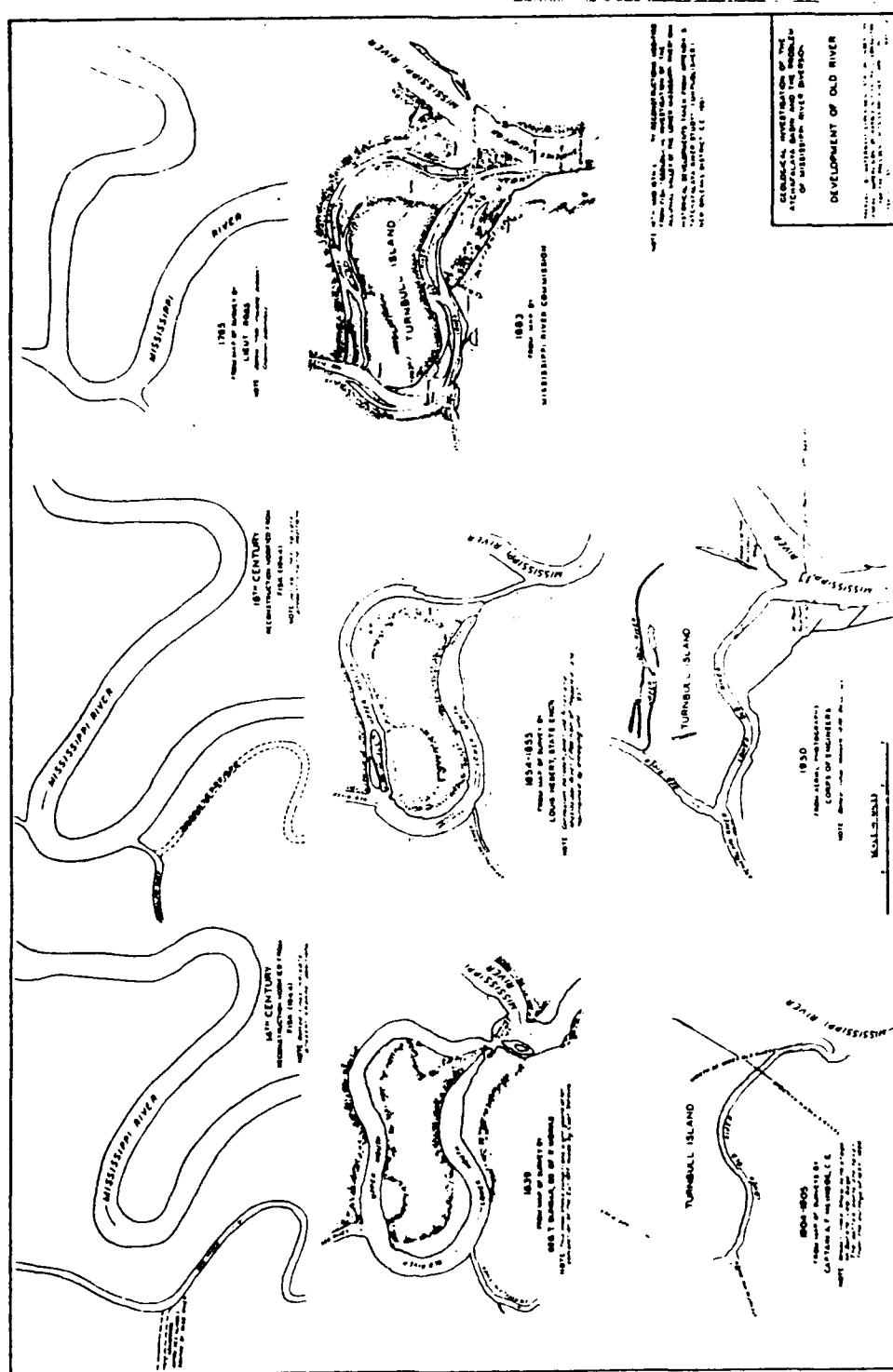
Geomorphic changes since human occupation of region have been quite extensive. In the 14th century, the courses of the Mississippi River and Red Rivers were close in the vicinity of Old River (Fisk 1944; 1952). Just south of this Old River, in the vicinity of the upstream part of Raccourci Island is where the Red River joined the Mississippi River. This course was abandoned by the 16th century, and is now named Bayou Lettsworth. The Atchafalaya River formed in the 16th century when a westerly migrating meander of the Mississippi River intercepted the course of the Red River and captured its drainage. For years it remained an insignificant distributary of the Mississippi River because it was choked on its upstream end by a log jam on the outer end of Turnbull's bend, where the Red River flowed into the Mississippi. The Atchafalaya now has numerous tributaries and flow is about one-third of the Mississippi.

Lower Old River was formed in 1831, when Henry Shreve ordered the channel at Turnbull's bend to be dug to shorten the course of the Mississippi, causing the Red River to be connected with Upper Old River rather than directly into the Mississippi (Figure 5). The cutoff in the vicinity of mile 304 to 302 AHP, which was made in 1831 is known as Shreve's cutoff. The artificial cutoff shortened the distance of the river by 15 miles (Elliott 1932). Shreve's cutoff did not eliminate shoaling; it merely transferred the zone of shoaling to a new location on the Mississippi. Old River since 1831 has been the site of almost continual trouble in the maintenance of navigation as the upper end of the old channel has closed off entirely and the lower end filled with silt and closed off at times. This separated the Red and Atchafalaya rivers from the Mississippi, and caused the Atchafalaya to become a continuation of the Red River. Had Shreve's cutoff not been made, it is possible that the removal of the Atchafalaya raft would have been followed by diversion of the Mississippi River discharge.

In 1839, the State of Louisiana began to burn, blast, and dredge the log jam on the Atchafalaya. Flow through the connecting link changed from a situation where reversals occurred depending on whether flow was higher in the Mississippi or the Red River to a situation where the Atchafalaya continued to enlarge by receiving progressively greater amounts of flow in the Mississippi River. This enlargement could have resulted in diversion or capture of most of the Mississippi River by the Atchafalaya River.

Eventually, the upper portion of the meander loop filled, leaving only the lower course or Lower Old river connecting the Mississippi with the Red and Atchafalaya rivers. After 1872 and through 1963, the Red River was directed into the Mississippi by a connection through Lower Old River. In the early 1960s the Old River Control Project was built, which includes the Low-Sill Control Structure, the Overbank Control Structure, the Old River Navigation Lock, and the Levee from Black Hawk to Torras. This project was designed to maintain the balance of flows from the Mississippi into the Atchafalaya River and Basin with control structures on the right bank of the Mississippi River. Lower Old River was artificially closed on July 12, 1963. The Old River Outflow Channel, where flow was controlled, was the replacement for Lower Old River. The Old River Navigation Lock, completed in 1962,

Figure 5. Geological development of the Old River region (from Fisk 1944; 1952).



provides for continued navigation between the Atchafalaya, Ouachita-Black, and Red rivers, and the Mississippi River through Lower Old River. About 16 miles of levee join the right bank main-line levee at Black Hawk with the control structures and lock, and bank stabilization works have been completed as required to control the meandering of channels. The Old River Auxiliary Structure was added to this project, being completed in 1987, to further reduce the possibility of diversion during extreme floods.

Since the basin experienced increased flow, several of the lakes that are adjacent to or form part of the channel network have experienced gradual infilling over time. Lakes Fausse Pointe, Verret, and Palourde were separated from the river system upon completion of the floodway guide levees in the 1930's, and thus have received less sediment than the proximal lakes subject to continual flooding. These floodway guide levees were authorized with passage of the Flood Control Act of 1928 after extensive flooding of the Mississippi River system in 1927.

Estimates of Global and Local Sea Level Rise

Relative sea level rise refers to the long-term, absolute vertical relationship between the land and water surfaces, excluding the short-term effects of wind and astronomical tides. Relative sea level rise is controlled by seven major factors (Adams et al. 1976; Kolb and van Lopik 1958): 1) eustacy; 2) geosyncline downwarping; 3) compaction of Tertiary and Pleistocene deposits; 4) compaction of Holocene deposits; 5) localized consolidation; 6) tectonic activity; and 7) subsurface fluid withdrawal. Kolb (1958) suggests that the single most important cause of subsidence in this region is the consolidation of high-water content prodelta clays. Previous estimates of subsidence in south Louisiana include 7.8 in/century (3.2 mm/yr) of average regional subsidence for the last 3500 years (Penland and Boyd 1985), 4.7 in/century (1.2 mm/yr) for the Pontchartrain basin (Saucier 1963), and 4.3 in/century (1.1 mm/yr) of regional subsidence for the last 3500 years.

Eustacy refers to the global sea level regime and its fluctuations; it is primarily controlled by the changing volumes of the planet's glaciers and ice caps, as well as by worldwide tectonic activity and density-temperature relationships. Global sea level has been oscillating about a steady mean for the past 4000 years; these oscillations have amplitudes of 1 to 2 m on time scales of hundreds of years (Nummedal 1983). A recent study based on analysis of 190 tide gage records worldwide concluded that mean eustatic sea level is rising at a rate of 0.05 in/yr (0.12 cm/yr) (Gornitz et al. 1982). For the Gulf of Mexico, the regional rate of sea level rise was 0.09 in/yr (0.23 cm/yr) (Gornitz et al. 1982).

Geosynclinal downwarping is a minor factor in the observed sea level rise in coastal Louisiana. A sequence of shallow-water sediments about 40,000 ft (12,000 m) thick has accumulated in the geosyncline, downwarping the Mesozoic basement are creating a gradually subsiding trough. An estimated average rate of downwarping over the past 60 million years is 0.01 in/yr (0.02 cm/yr); because downwarping is a function of loading it is greatest during periods of greatest sedimentation.

Consolidation of Tertiary and Pleistocene deposits was analyzed by Fisk and McFarlan (1955) who examined the Pleistocene subsurface geometry. They observed subsidence rates as great as 0.09 in/yr (0.23 cm/yr) along the axis of the infilled alluvial valley south of Houma. These rates are considerable compared to many other causes of relative sea level rise.

Compaction of Holocene deposits is considered to be the primary cause of relative sea level rise presently occurring in coastal Louisiana. Kolb (1958) believed that consolidation of the high water content Holocene prodelta clays is perhaps the most important factor affecting subsidence). Holocene compaction consists of three major components (Roberts 1985; Terzaghi 1943) including the following: 1) primary consolidation; 2) secondary consolidation; and, 3) oxidation of organic materials. Primary consolidation occurs when dewatering reduces the volume of the soil. Secondary consolidation occurs when soil volume is reduced because of the rearrangement of internal structure. Oxidation of organic matter causes further losses in soil volume. When deposits with high-percent organic content are reclaimed from marshes and lake bottoms for suburban development, the organic material dries and the soil subsides as a portion of the material is released as CO₂ gas.

Localized consolidation, caused by landforms with relatively high specific gravity or by engineering structures, is locally important but geographically highly variable. Landforms such as natural levees and cheniers have locally greater subsidence than surrounding organics, silts, and clays (Kolb and van Lopik 1958; Morgan 1973). Several structures built in the 1700s lie a meter or more below sea level, far greater than would be expected from the other causes of relative sea level rise combined.

Tectonic activity and subsurface fluid withdrawal of water and hydrocarbons can contribute to sea level changes and are locally important but geographically highly variable. The downthrown end of growth faults is where the most pronounced changes take place. The removal of subsurface fluids has resulted in significant subsidence in the vicinity of Galveston, Texas (Kreitler 1977), although little documentation exists on the effects of fluid withdrawal in coastal Louisiana.

Recent sedimentation is an important process in the vicinity of the project area that has blanketed preexisting geomorphic surfaces in many areas, making identification of buried geomorphic surfaces difficult. The Atchafalaya basin has received progressive basin-wide vertical sedimentation throughout the Holocene. The vertical chronology of the Atchafalaya basin sediments, as established by radiometric dating (Smith et al. 1986), indicates that the upper 15 ft (4.5 m) of sediment is younger than 3,500 years old and the upper 30 ft (9 m) of sediment is generally less than 5,500 years old. Sediments in the basin below 30 ft (9 m) and above a depth of 110 to 130 ft (35 to 40 m) generally date from the period 5,550 to 10,000 BP.

Land loss in the vicinity of the proposed project area has occurred in recent years, particularly south of the project area in Terrebonne Parish. Several "hot spots", or areas of extensive land loss, without obvious causal explanation occur in the vicinity of the project area, particularly in the coastal marsh (May and Britsch 1987). Although such losses have not occurred

in the project area, land loss to the south could result in increased saltwater intrusion and tidal activity and could eventually have an impact on the project area.

Relationships of Geomorphology with Human Settlement and Resources

Four major stages of human activities have occurred in the basin, which have affected processes and landforms, as follows: 1) initial occupation by Indian settlers; 2) initial occupation by European settlers who utilized this area for agriculture, fishing, and timber; 3) development of transportation networks in the basin interior, allowing for improved navigation of steamships and major railroad routes; and 4) modification of the basin to alleviate the effects of floods in response to the major flood of 1927.

Natural levees, point bar ridges, and terrace escarpments have been the preferred landforms for prehistoric cultures in alluvial settings. Distributary channels, beach ridges, and salt domes have been preferred landform sites in coastal settings. Advantages of such sites for human occupation include soil drainage, the availability of natural resources, proximity to transportation routes, and protection from flooding and other natural hazards. Human settlement and resource utilization in the Mississippi River delta plain has followed changes in the geomorphic systems (McIntire 1958). When river diversion built a new system of levees and caused reduced fresh water and sediment supply in older courses, habitation on the older levees became less desirable and the settlements were abandoned. The humans then migrated to the newer, active river systems.

Prehistoric cultures in the vicinity of the project area appear to have been concentrated on natural levees of distributaries and the shore of large lakes in the Atchafalaya basin (Smith et al. 1986). These environments may be buried by as much as 30 to 35 m (95 to 110 ft of Holocene sediment. Archaeological sites which occur on subaerial natural levees of abandoned distributaries in the Atchafalaya basin are probably less than 3,000 years and are usually younger than 1,500 years old. Archaeological sites associated with prehistoric lake shores in the Atchafalaya basin are probably younger than 1,500 years old.

Modern geomorphic processes have destroyed or disturbed several of the prehistoric and historic sites recognized in previous studies. McIntire (1958) reports that many sites surveyed by Kniffen (1936) in coastal Louisiana parishes have long since been destroyed by human activities such as road construction and natural processes such as burial by sedimentation, or erosion into lakes, bayous, and the Gulf of Mexico. Relative sea level has risen since the late Wisconsinan deglaciation and subsidence has led to the destruction, burial, or submergence of a number of archeological sites. Depth of burial of archaeological sites would be dependent upon their age and the elevation of the surface at the time of burial. In particular, many of the middens and artificial mounds in south Louisiana are presently below the high water mark because of subsidence. The bases of some sites in coastal Louisiana have subsided to a depth of twenty feet due to local consolidation (McIntire 1958). Subsidence-induced sea level rise caused by compaction of sediments generally decreases with time (Morgan and Larimore 1957). Soon following abandonment, interstitial water losses are high

causing rapid rates of subsidence. Once much of the water is removed, the rates of subsidence decrease.

In summary, several interrelated factors have, over the millenia, impacted and delimited the cultural resources of the project area. Specifically, changing courses and flows of the Mississippi River, the Atchafalaya River, and all associated distributaries, and changing sea levels, have dictated both local environments available for habitation by prehistoric groups, and the preservation of their material remains. In the project area, numerous specific depositional regimes may characterize the buried clays and silts; more recent depositions can be traced to backswamp and lacustrine environments, at least partially in association with the active distributaries (Belle River, Bayou Magazille). Such environments were probably only fixed as recently as 3000 years ago, and may be substantially younger than 1500 years in some specific locations. This would suggest that only recent archaeological remains may have been present in the immediate project area. Even more current factors, such as subsidence, and modern road construction and borrowing activities, may have negatively impacted extant archaeological sites.

Chapter 3. DESCRIPTION OF THE AREA

The survey area is a 450' strip of land extending for 5500 feet along the west bank of the Belle River, southern St. Martin Parish, Louisiana. The area begins at the intersections of Sections 17, 18, 19, and 20 of Township 14 S and Range 13 E and continues eastward to a point opposite the mouth of Bayou Magazille, where the Belle River bends to the south (Figure 1).

As implied by the previous section, the survey area in historic and prehistoric times has undergone substantial geomorphologic change and currently incorporates the natural levee and backswamp of the Belle River. However, within the past 15-20 years, the area has been extensively modified. The recent changes in appearance of the land can be traced to two sources; large-scale borrowing activities and occupation by a local family.

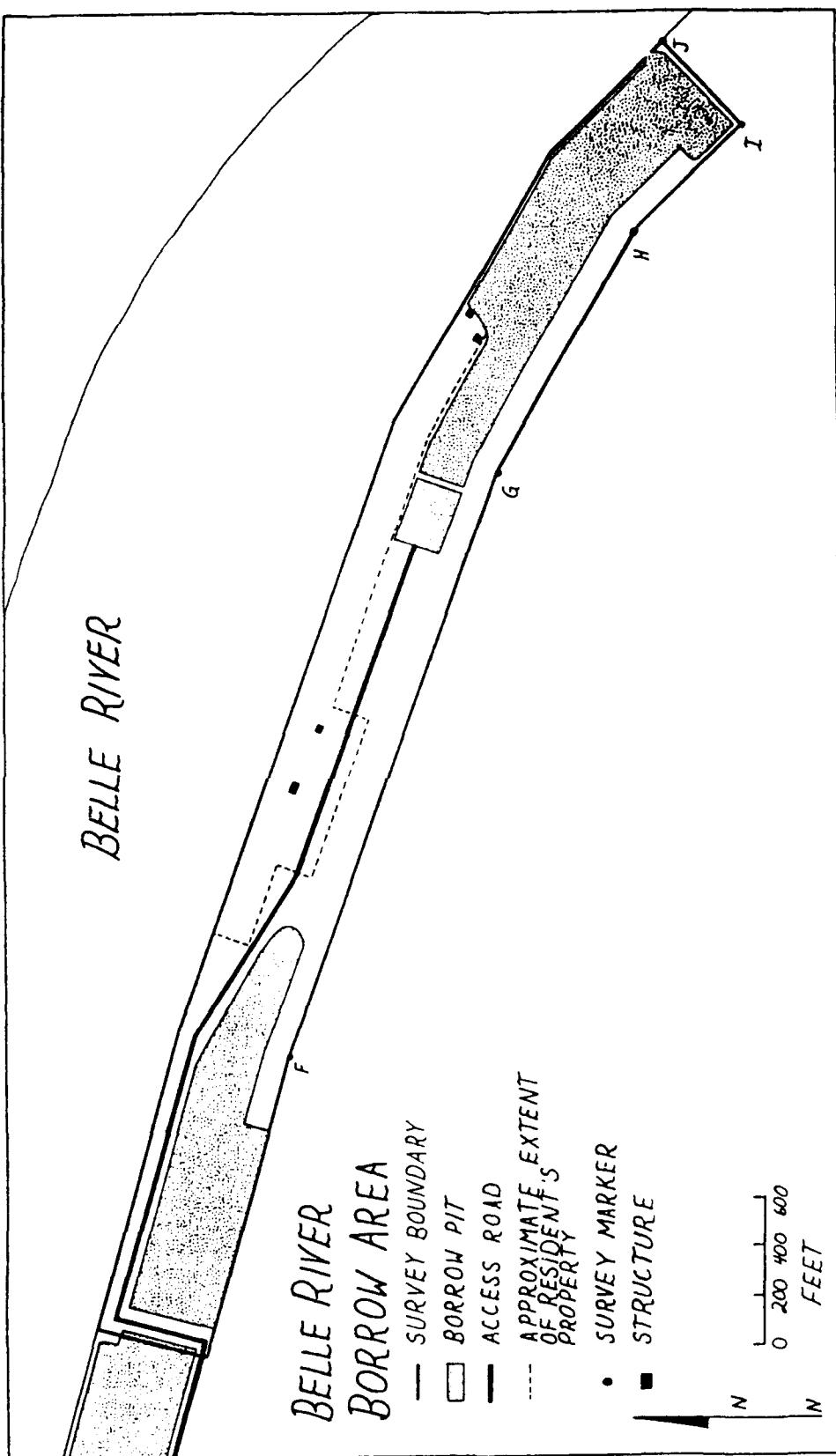
Previous excavations and related land modifications dominate the current landscape (Figure 6). At least three distinct borrow pits lay within the designated boundaries; an additional pit borders the western edge. This latter borrow area is approximately 300 feet from north to south. Its northern edge extends to between 10 and 30 feet from the Belle River and its southern edge is within 10 feet of the extant access road. Approximately 30 feet of this pit extends across the western boundary of the survey area.

The next borrow pit to the east is more completely within the survey area. It extends to a maximum of 1600 feet from east to west, and measures at least 200 feet from north to south. About 800 feet from its western edge, the shape of the pit becomes irregular. The southern edge takes a sharp right turn for at least 100 feet to the north. Its northern boundary tapers gradually and meets the southern edge almost forming a point. The western and northern edges parallel the access road and, in most locations, lie within 10-20 feet of it. The furthest extent of the southern border continues beyond the southern edge of the survey area. The remainder of the pit's southern edge is approximately 100 feet inside of the survey area's southern boundary.

The remaining two borrow pits are located at the eastern end of the survey area. The first is relatively small (260 by 200 feet) and is within 100 feet of the survey boundary to the south and 150 feet of the bank of the Belle River. The last borrow pit is the largest, and is located immediately east of the pit just mentioned; a narrow dam (10-15 feet wide) separates the two. Like the large pit at the western edge of the survey area, this pit is irregular in shape. It measures a maximum of 1900 feet from east to west and a maximum of 420 feet from north to south. For 700 feet from the pit's northwestern corner, the northern border is approximately 150 feet from the Belle River. For 1700 feet from the southwestern corner, the southern boundary averages 100 feet from the southern extent of the survey area. Beyond these points, the northern and southern borders expand to within 10-20 feet of the extent of the survey area and continue to a line 10-20 feet short of the eastern edge of the survey area.

In summary, of the approximately 57 acres within the survey area, about 26 acres, or 46 %, consist of previously excavated borrow pits.

Figure 6. Plan Map of the Project Area.



Other more subtle effects of the borrowing activities are also in evidence. Small spoil piles, 2-3 feet high and 3-5 feet wide, border most sides of the borrow pits and function as dams or levees. The present access road enters the survey area at the southwestern corner, runs along the western edge, extends along the northern quadrant, angles south and continues eastward across the middle of the survey area to the western edge of the eastern borrow pits. This road, which also services the residents, has been heavily utilized. As a consequence, the road has been regrated, leveled and generally rebuilt several times. Not surprisingly, the land within at least 10 feet on either side has also been extensively disturbed.

The Lloyd Gros family currently resides within the survey area. They claim property rights to approximately 12 acres in the form of a 150 feet strip of land extending 2700 feet along the shoreline, and an additional 650 by 150 foot parcel in roughly the center of the survey area. Their house and shed are located on the edge of this extra parcel (Figure 6).

Over the years of their occupation of this property, they, in conjunction with the previous borrowing activities, have overseen and/or initiated several episodes of land-filling and land-leveling. Mrs. Gros informed us that an unknown area of land immediately south of their house had been filled in and leveled out over the years. She also told us that the area on either side of the access road between their extra parcel of land and the eastern borrow pits had been built up and leveled off.

A final consequence of their occupation is a 8-10 foot wide drainage ditch extending from their house eastward to the borrow pits and westward along the access road to the edge of their property. The ditch is approximately 150 feet from the bank of the Belle River.

In short, between the excavation and filling activities, as much as 60 % of the survey area has been modified in recent times.

Floral Communities

Prior to extensive human disturbance, the natural vegetation of the study area would have reflected a combination of a cypress-tupelo swamp community in the low-lying, often flooded areas, and a lowland hardwood forest on the levees and slightly higher grounds. Around the edges of the study area, these floral communities, typical of the Atchafalaya Basin, can still be found. The following discussion is drawn primarily from Kniffen (1968) and U.S. Army Corps of Engineers (1974).

In the swamps proper, bald cypress (Taxodium dictichum) and tupelo gum (Nyssa aquatica) are the dominant trees. Also found are red maple (Acer drummondii), pumpkin, water, and green ashes (Fraxinus sp.), and black gum (Nyssa sylvatica). An understory in such a setting includes palmetto (Sabal minor), button bush (Cephalanthus occidentalis), deciduous holly (Ilex decidua), wax myrtle (Myrica cerifera), and swamp privet (Forestiera acuminata). Poison ivy (Rhus toxicodendron), rattan vine (Beichemia scandens), trumpet vine (Campsis radicans), muscadine (Vitis rotundifolia), Virginia creeper (Parthenocissus quinquefolia), and Spanish moss (Tillandsia usneoides) are among the numerous vines. Herbaceous plants abound and include alligator weed (Alternanthera

philoxerooides), smartweeds (Polygonum sp.), water hyacinth (Eichornia crassipes), frogsbit (Limnobium spongia), shield fern (Dryopteris normalis), and duckweed (Lemna minor).

On the levee and drier ground within the swamp, a variety of trees such as the live oak (Quercus virginiana), sweetgum (Liquidambar styraciflua), green ash (Fraxinus pennsylvanica), bitter pecan (Carya aquatica), hackberry (Celtis laevigata), water oak (Quercus nigra), nuttall oak (Q. nuttallii), American elm (Ulmus americana), and black willow (Salix nigra) can be found. Shrubs and understory taxa include palmetto, yaupon (Ilex vomitoria), deciduous holly, mulberry (Calicarpa americana), and elderberry (Sambucus canadensis). Vines such as wild grape (Vitis vulpina), poison ivy, Virginia creeper, rattan vine, morning glory (Ipomoea hederacea), and pepper vine (Ampelopsis arborea) are also found in the hardwood forests. Elephant's ear (Peltandra virginica), panic grasses (Panicum sp.), wild chervil (Chaerophyllum demersum), thoroughworts (Eupatorium sp.), butterweed (Senecio glabellus), oak forest grass (Oplismenus setarius), and lizard's tail (Saururus cernuus) are among the herbaceous plants.

The portions of the survey area that have been cleared for the borrow excavations, the access road, etc. are covered by pioneer taxa transitional between the hardwoods and the cypress-tupelo. If left alone, a willow-cottonwood-sycamore forest would probably develop here. Currently, however, the banks of the borrow pits and the roadsides are covered by grasses and only a few young trees. The pits themselves are filled with water hyacinth. The trees are predominantly cottonwood (Populus deltoides) and black willow (Salix nigra). Shrubs include hawthorne (Crataegus viridis) and blackberry (Rubus louisianus), while grasses include sedges (Cyperus sp.), rushes (Juncus sp.), and various other prairie grasses and dayflowers.

Faunal Communities

The fauna along the Belle River are typical of those found in low-lying swamp and riverine regions within the Atchafalaya Basin and across much of southern Louisiana. With a few exceptions, this fauna closely parallels that which would have been found in earlier times. The following discussion is taken from Kniffen (1968) and U.S. Army Corps of Engineers (1974).

Mammals often seen here include deer (Odocoileus virginianus), raccoons (Procyon lotor), opossums (Didelphis virginiana), and swamp rabbits (Sylvilagus aquaticus). The recently introduced nutria (Myocastor coypus) is also present in great numbers. Smaller mammals in residence include the mink (Mustela vison), various skunks (Mephitis sp.), fox and gray squirrels (Sciurus sp.), shrews, and mice. At one time, the black bear (Ursus luteolus), cougar (Felis concolor), and bobcat (Lynx rufus) would have been common.

Reptiles and amphibians are equally abundant. Alligators (Alligator mississippiensis), eastern box turtles (Terrapene carolina), snapping turtles (Chelydra serpentina), eastern garter snakes (Thamnophis sirtalis), green tree frogs (Hyla cinerea), and bullfrogs (Rana sp.) were all observed during our survey. Other turtles (e.g. Mississippi mud turtle, Kinosternon subrubrum, southern painted turtle, Chrysemys picta, and stinkpot, Sternotherus carinatus), frogs (e.g. spring peeper, Hyla crucifer, and squirrel treefrog, H. squirella),

and snakes (e.g. water moccasin, Agkistrodon piscivorus, diamondback water snakes, Natrix rhomifera, and western mud snakes, Farancia abacura) are all native to the region.

Not surprisingly, birds are also quite plentiful. Most prominent in the swamp, perhaps, are large birds such as the great blue heron (Ardea herodias), Louisiana heron (Hydranassa tricolor), snowy egret (Leucophoyx thula), American egret (Casmerodius albus), cattle egret (Bubulcus ibis), wood ibis (Mycteria americana), white ibis (Eudocimus albus), great horned owl (Bubo virginianus), barred owl (Strix varia), screech owl (Otus asio), and various hawks (Falco sp., Buteo sp.). Along the banks of the Belle River, waterfowl are plentiful and include more than 20 species of ducks, geese, and teals. Many smaller birds of the order Passeriform can also be found.

In the waterways, a large number of fish make their homes. A very few of these include sunfish and bluegills (Lepomis sp.), alligator gar (Lepisosteus spatula), large mouth bass (Micropterus salmoides), crappie or sac-a-lait (Pomoxis annularis), and catfish (Ictalurus sp.).

Finally, bivalves such as the brackish water clam (Rangia cuneata), and American oyster (Crassostrea virginica) are native to coastal Louisiana. The distribution of these taxa is at least partially dependent on the salinity of the water. Although the Belle River above Bayou Magazille does not appear to have been saline enough to support the oyster, the clam could have survived and flourished.

Chapter 4. PREHISTORY OF THE LOWER MISSISSIPPI VALLEY

According to the most conservative estimates, humans arrived in North America at least 12,000 years ago at the tail end of the Pleistocene. Their spread across the continent, and indeed across the hemisphere, was fairly rapid so that by approximately 10,000 years ago most habitats in North America were occupied.

In the Plains and southwestern areas of this continent, the archaeological manifestations of the Paleoindian period were first defined and are best known. Here, evidence suggests a mobile adaptation focusing on hunting and/or scavenging of large mammals. Thin, well-made, lanceolate projectile points that are occasionally fluted along the bases are found in association with extinct megafauna such as mammoth and giant bison.

In the eastern United States, such diagnostic points are also found, often in conjunction with mastodon remains. However, it has not yet been resolved whether Paleoindian adaptations in the eastern woodlands exactly parallel those found further west (Meltzer 1988).

In the Lower Mississippi Valley, and Louisiana in particular, evidence concerning Paleoindian occupation is slim. Although lanceolate points have been found at several locations across the state, they are almost without exception surface finds. As a result, there is little detailed information of the distribution and adaptations of Louisiana's earliest inhabitants (Gagliano 1963).

This is hardly surprising given the relative youth of Louisiana's landscape (Haag 1971; Springer 1972). It is of course possible that the Lower Mississippi Valley was simply not extensively occupied during Paleoindian times. However, it is also possible that people were here and their material remains have, over the millennia, been washed away, buried, or submerged. Whichever of these scenarios is accurate, evidence for very early human occupation in Louisiana is uncertain at best (Neuman 1984).

For several thousand years following the extinction of the megafauna, archaeologists recognize a dramatic change in cultural adaptation across the continent. Termed the Mesoindian, or Archaic, this period of time can be characterized both by an increased complexity in resource utilization, and increased regional specialization. Instead of focusing on a few large taxa, humans availed themselves of a wide variety of both plant and animal resources found within their own region. For example, it was during the Archaic that shellfish were first exploited as a significant food source (Haag 1971). In fact, in many places across the east, almost every edible food was utilized.

Depending on the particular location, new strategies were developed to acquire these foods. First, settlement patterns mirrored regional resource availability. Secondly, the technology was improved and diversified. Tools such as fishhooks, atlatls, nets, traps, wiers, knives, drills, axes, grinding stones, etc., became part of the prehistoric inventory (Neuman 1984).

In Louisiana, the Archaic is not much better known than the Paleoindian.

Again, this is hardly surprising given the age of the ground surfaces. However, a few more sites have been recognized, especially from the more recent end of the period and from the northern and upland portions of the state (Haag 1971).

Information that has been recovered does not conflict with the kinds of interpretations drawn from Archaic sites elsewhere in the eastern woodlands. The scarce subsistence and settlement information suggests a diversified resource base, and the possibility of seasonal settlement patterns (Gagliano 1963). The lithic material recovered is also characteristic of a variety of activities, and includes a number of different projectile point styles.

From about 1500 B.C. to 800 B.C., archaeologists have identified the Poverty Point period as marking a distinctive set of traits found within Louisiana, Arkansas and Mississippi. The type site, near the town of Epps in northeastern Louisiana, consists of several earthen mounds, one of which appears to resemble a bird, and six concentric earthen rings about one mile in diameter. Artifacts from the Poverty Point site are numerous, but the most distinctive include the following: fired clay balls in various shapes that may have been used for cooking or heating, exotic trade materials such as steatite, copper, galena, and red jasper, an extensive lapidary industry, and a lithic inventory that includes blades and microblades (Gibson 1983; Webb 1982).

The high archaeological visibility of these kinds of materials should mean that the time period is well understood. In fact, more than 100 sites have been recorded along active and relict river channels across the Lower Mississippi Valley (Webb 1982).

At the same time, the exotic and unusual nature of Poverty Point has raised several questions that have not been fully resolved. One important issue concerns the exact relationship between Poverty Point and the preceding late Archaic periods (Haag 1971; Ramenofsky and Mires 1985). Although the initial appearance of Poverty Point characteristics is known fairly well, the termination of late Archaic traits is less clear. In at least some cases, sites with late Archaic characteristics are contemporaneous with Poverty Point sites. Also, some late Archaic materials seem to occur at both late Archaic and Poverty Point sites; projectile points such as Gary and Ellis, and faunal bone indicating a generalized resource utilization are but two examples. In other words, it may be the case that Poverty Point is a cultural adaptation derived from the late Archaic but not incorporated by all groups present during the late Archaic period (Ramenofsky 1986). Whatever the relationship may turn out to be, it is clear that Poverty Point is important in Lower Mississippi Valley prehistory.

Following the Poverty Point period is the Tchula period. The segment most relevant to southern Louisiana is the Tchefuncte period, lasting from approximately 500 B.C. to 0 (Phillips 1970). In comparison with the Poverty Point period, Tchefuncte exhibits far fewer "exciting" characteristics. For example, there are no longer any fancy beads or trade goods. At the same time, Tchefuncte marks the onset of several significant technological shifts, including the first extensive use of pottery and the earliest (well-documented) wide-spread exploitation of coastal resources (Haag 1971; Neuman 1984).

Concentrated in southern and coastal Louisiana, the majority of the sites

from this time consist of shell middens along extant or relict minor and intermediate waterways (Shenkel 1984). Because the accumulated shell, generally Rangia cuneata, facilitates preservation of organic remains, bone points and other implements, and faunal and floral food remains are well documented from a number of sites. Freshwater drum, and deer have been recovered from the Big and Little Oak Island sites (Shenkel 1984). Similar faunal remains have been recovered from the Morton Shell Mound, as have such plants as hickory, walnut, acorn, and persimmon (Byrd and Neuman 1978).

The pottery is somewhat crude, usually tempered with grog or clay and decorated with a combination of incising, stamping and punctuation. Also recovered from Tchefuncte sites are numerous stone tools such as bifaces, burins, groundstone tools, and fired clay balls less elaborate than those found at Poverty Point sites (Neuman 1984).

Sequential to the Tchefuncte period across Louisiana is the Marksville period (0-A.D. 300), characteristics of which closely parallel those of the Hopewell period in the Ohio and Illinois River valleys (Haag 1971; Neuman 1984). Both Hopewell and Marksville signify a pattern of burial ceremonialism that includes interment of individuals in prepared locations within conical earthen mounds. Often found in association with the graves are elaborate exotic materials. At the Crooks site in northern Louisiana, for example, quartz crystals, copper, conch shell, pearls and galena were recovered from a mound reportedly containing over 1000 burials (Ford and Willey 1940).

The Marksville pottery styles are also quite similar to Hopewell designs. Instead of the geometric patterns typical of Tchefuncte, Marksville pottery relies heavily on abstract, often zoomorphic incisions. Zoned rocker stamping and punctuation can also be found on these small, clay tempered vessels (Phillips 1970).

As with Poverty Point, the exotic ceremonial nature of Marksville (and Hopewell) has, over the years of archaeological investigation, somewhat overshadowed questions of subsistence and settlement. In Hopewell areas, settlement is usually dispersed, with small hamlets surrounding ceremonial centers. In these areas, a wide variety of resources continue to be exploited, with major innovation being the introduction of domesticated native cultigens. In Louisiana, the patterns are less well documented, but do generally seem to parallel Hopewell, the exception being that there is little solid evidence of horticulture in this portion of the Lower Mississippi Valley. Instead, Marksville subsistence seems to directly follow patterns of riverine, and terrestrial resource exploitation established during the late Archaic and Tchefuncte periods (Neuman 1984).

Between Marksville and the succeeding Coles Creek periods, from about A.D. 300-700, most Lower Mississippi Valley archaeologists recognize an intermediate period, alternatively called Troyville (Ford 1951; Gibson 1982a), Baytown (Phillips 1970), and/or Issequena (Gibson 1982b; Greengo 1964). Because each of these configurations incorporates a slightly different series of characteristics, this interval is not well understood (Gibson 1982a; Phillips 1970). Depending on the interpretation, pottery styles are either an apparent degeneration of Marksville styles, an entirely different set of styles, or both.

Consequently, the sites and components attributed to this interval vary.

Most agree that the Marksville burial mounds and associated elaborate material culture are not present. Yet, it is unclear whether platform mounds occur during this interval (Haag 1971).

In all scenarios, habitation sites are more numerous and often larger than during the Marksville period. Pole and thatch structures are found for the first time in significant numbers (Neuman 1984). The appearance of a more stable, "domestic" existence is supported by the increase in large utilitarian, undecorated pottery (Williams and Brain 1983). At the same time, there is no strong evidence that the subsistence base is drastically different than in previous periods. While specific resources may appear to have gained or lost in importance, depending both on the location and the archaeologist's view of this temporal interval, there is no definite evidence of sustained horticulture. At the Brusly St. Martin site, for example, fish, mammals, shellfish, and birds were found in significant quantities (Springer 1972).

Definitions of the succeeding Coles Creek period (A. D. 700-1200) are less controversial. Pottery is still clay or grog tempered, but the technology improves and the pottery pastes are harder, often polished, and in general, better manufactured. Designs are mostly simple rectilinear or linear, and are neatly applied to the upper portions or rims of vessels.

Coles Creek sites are at least as wide-spread as those from the preceding period. Many include one or more flat-topped, rectangular mounds (Haag 1971; Neuman 1984). At the larger sites, mounds may be arranged around an open area. Excavations of these "pyramid" mounds have yielded evidence of their construction and function (Williams and Brain 1983). At the Greenhouse site, for example, mounds were constructed in phases, with large structures present on the successive surfaces (Ford 1951). This pattern would seem to suggest that the mounds served as foundations for special purpose buildings, or, possibly, residences of important individuals (Neuman 1984). At most mound sites, there is little evidence of sustained habitation by a significant number of people. Instead, populations were dispersed in villages around the mound centers (Phillips 1970).

From A. D. 1200 until European contact, archaeologists have defined the Mississippi period. While this period denotes a similar suite of characteristics across eastern North America, the pattern is slightly different in the lower reaches of the Lower Mississippi Valley. In its classic configuration, the Mississippi period incorporates shell-tempered pottery, maize agriculture, and platform mounds. The pottery is well made, and is elaborately decorated with curvilinear designs and some painting. Subsistence is based on domesticated corn, beans, and squash, as well as occasional continued reliance on native cultigens and a variety of faunal taxa. Mounds occur singly, or in groups, and sites are occasionally quite elaborate and well fortified.

In Louisiana, this general suite of traits does occur within the Mississippi period. However, there is a slightly different set of characteristics, known as Plaquemine, that partially overlaps classic Mississippian traits in time. Plaquemine is viewed as a local outgrowth of

Coles Creek; many Coles Creek sites also have Plaquemine components, platform mounds continue to be built, and most pottery styles are essentially modifications of Coles Creek styles (Haag 1971; Neuman 1984). At varying times across Louisiana, Plaquemine characteristics are replaced by Mississippian characteristics. This transition is earlier to the north (e.g. within the Yazoo Basin) than it is elsewhere (Phillips 1970; Williams and Brain 1983).

No matter what the particular sequence is, the Mississippi period is characterized by platform mounds, and curvilinear and rectilinear designs on well fired clay or shell tempered pottery. Some form of horticulture is eventually practiced in most areas, although many sites show a continued reliance on a wide range of native flora and fauna.

This was essentially the situation when the early European explorers reached the Lower Mississippi Valley. De Soto's entrada recorded large villages with mounds and individuals hunting and practicing agriculture. By the time the French arrived in large numbers, the previously stable region had begun to change. The introduction of infectious diseases brought on severe population losses (Ramenofsky 1987). This, in conjunction with the arrival of Europeans, dramatically impacted interpopulation relationships. Groups such as the Houma, Bayogoula, Acolapissa, Chitimacha, and Mugalasha moved around, joined with or adopted remnants of other groups, fought each other, etc. In other words, from at least the time of the French settlement in the 18th century, most native groups were constantly changing their names, locations, culture, and were, in general, in turmoil (Haag 1971; Kniffen et al. 1987).

Prehistory of the Atchafalaya Basin

The previous section represents a brief overview of the commonly accepted culture history of Louisiana and the lower reaches of the Lower Mississippi Valley. The basic sequence was worked out in the 1930s and 1940s by J. Ford and associates in conjunction with the federally sponsored WPA-Archaeology program. Ford and colleagues concentrated their efforts on a number of significant sites located in and near the Lower Red River basin (Neuman 1984). As such, this culture history is most appropriate for the prehistory of that area.

There have been some recent indications that the accepted sequence is not applicable, either in whole or in part, to the cultural resources of coastal regions of Louisiana and many portions of the Atchafalaya Basin. Stated rather bluntly, it just doesn't seem to fit very well. This is primarily because Atchafalaya Basin and coastal sites were not extensively considered when the sequence was being formulated; any culture history is only applicable to the material it was designed to cover.

The exclusion of swamp and wetlands sites may be traced to many factors. Two are relevant here. First, the rapidly changing landscape may have masked some segments of the archaeological record. As channels have moved and the land subsided, older sites may have been buried, washed away, or inundated. As a result, the prehistoric sequence may simply be incomplete in these regions. Secondly, as Gibson (1982c) has suggested, the inaccessibility and harshness of the swamps and marshes has inhibited sustained archaeological investigation (i.e. Why be miserable in the swamp when there is plenty to investigate in drier

areas?). In fact, systematic scientific exploration of the basin is a relatively recent phenomenon.

There were a few early forays into the swamps in the early part of the century. In 1913, C. B. Moore took his steamboat down various waterway, including the Atchafalaya, and Bayou Teche and located a number of sites. He dug into several of these, recovering burials and ceramics (Moore 1913).

In the late 1930s, Fred B. Kniffen, a cultural geographer, recorded the distribution of shell middens in Iberville, St. Bernard, and Plaquemines Parishes (Kniffen 1936, 1938). His work is especially important because he was one of the first to accurately characterize these kinds of sites in Louisiana and correlate geomorphological and archaeological information. Specifically, he used the sequence of river channels to determine a rough site chronology. His Bayou Cutler and Bayou Petrie phases have been generally correlated with the standard Coles Creek and Mississippi periods, respectively.

In the 1950s, W. G. McIntire investigated sites in coastal Louisiana (McIntire 1958). He also correlated archaeology and geomorphology, only this time, he used the sequence of archaeological sites to date river channels and other geomorphological features. He visited or recorded well over 500 sites along the coast of Louisiana.

Although individual sites have been investigated since the 1950s, the next period of sustained archaeological work was instigated by federal cultural resources assessment legislation in the 1960s and 1970s. Sponsored by the U. S. Army Corps of Engineers, several extensive archaeological surveys have been conducted throughout the Atchafalaya Basin (e.g. Gibson 1982c; Neuman and Servello 1976).

From this work, particularly Gibson's, several modifications on the standard cultural chronology can be suggested (Gibson 1982c). First, Gibson did not find any Archaic sites within the Atchafalaya Basin south of U.S. Highway 190. There were, however, some on the upland margins. Although many of these contained items, such as baked clay balls, that might suggest a loose affiliation with Poverty Point, the overall artifact inventories were more typical of late Archaic sites elsewhere in the region. Extending from these upland margin areas onto some the higher ground associated with the major river meander belts, Gibson noted Tchefuncte sites within the basin proper. As elsewhere in southern Louisiana, these sites are predominantly Rangia shell middens. In fact, the majority of all sites recorded in the basin are shell middens.

Following the initial foray into the basin during the Tchefuncte period, Gibson recorded a number of sites, pottery styles from which roughly corresponded to the Baytown/Troyville/Issequena interval. He did not, however, positively identify classic Marksville sites. Instead, he suggested that the Marksville exotic burial ceremonialism was never really incorporated by residents of the basin (Gibson 1982c; Haag 1971).

The sites attributed to the Baytown interval were distributed over a much broader area and across a wider range of local environments including lake edges, swamps, bayous, levees, and tidal channels. Although subsistence information has

not been obtained from many locations, investigations of the Brusly St. Martin site suggested an emphasis on aquatic resources (shell and fish) and numerous local wild plant taxa (Byrd and Neuman 1978; Springer 1972).

In the succeeding Coles Creek and Plaquemine periods, Gibson and others noted a greater number of sites. Some of these, again predominantly shell middens and not earthen mounds, were substantially larger than older sites. Small sites were also found. Even though the settlement patterns may have changed, a dramatic shift in subsistence was not recorded. Recovery of resources seems to have included specialized seasonal campsites. Yet, there was still an emphasis on local flora and fauna. Corn agriculture does not seem to occur in the southern Atchafalaya until late in the Mississippi period.

More than twenty sites have been recorded near this project's survey area (Division of Archaeology Site Files). Sites have been found on the banks of Lake Verret (AS 6, AS 8, AS 10, AS 21), near Grassy Lake and Lake Paloude (SM 21-25), along the banks of the Intracoastal Waterway (SM 45, SM 48, SM 51), along Bayou Magazille (SM 34, SM 35), on the banks of Belle River above the project area (AS 2, AS 4, AS 22, SM 6, SM 14, SM 44), and in or immediately adjacent to the project area itself (AS 25, SM 41, SM 42, SM 43).

Of these, all contain Rangia shell. Some, e.g. SM 51, have mixed soil and shell lenses. The sites vary in size (5 x 5 m to 500 m long) and shape (linear, oval). Several sites, especially along the Belle River and Intracoastal Waterway, have been either partially redeposited or partially truncated by dredging activities.

Faunal bone, pottery, and lithics were recovered from only half of the sites. Eleven were tentatively assigned to time periods. The earliest sites (five in number) are from some combination of Baytown and Coles Creek. Four sites seem to be Coles Creek and/or Plaquemine in age while two were identified as Plaquemine.

Two sites (SM 42 and SM 43) were recorded within the survey area (Neuman and Servello 1976). SM 42 was noted as being approximately seven meters wide and extending for about 85 m along the bank of the Belle River. Its shell lens was of a variable thickness (.35-1.10 m). No other prehistoric material was recovered, and the site was not assigned to a time period. SM 43 was recorded .9 miles west of Sm 42. It measured about 15 m wide and 35 m along the river, and was about .25 m thick. Oyster shell and one pottery sherd were also found. The site was tentatively assigned to the Plaquemine period. Both sites were presumed to represent short term, seasonal occupations by shellfish collectors. These sites were relocated during the course of the survey, as will be mentioned in the section on fieldwork.

Chapter 5. HISTORY OF ST. MARTIN PARISH

The history of St. Martin Parish has been shaped by geography and the flow of international and national politics. On an expedition searching for an all-water route to the Orient, in 1519 Alvarez de Pineda sailed along the northern coast of the Gulf of Mexico, encountering what may have been the mouth of the Mississippi River and making notes of his observations. Ten years later remnants of the ill-fated Narvaez expedition to colonize Florida retraced much the same course while attempting to reach the Spanish outpost at Panuco, Mexico. One of three survivors of this expedition, Cabeza de Vaca, recounted Indian stories of the fabulously wealthy Seven Cities of Cibola. Upon hearing these stories, Hernando DeSoto, the newly appointed Governor of Cuba and military commander of Florida, reasoned that Cibola might be within his jurisdiction. Based on this belief, in 1539 he launched an expedition that spent three years traversing a good deal of the present-day Southeastern United States. Having encountered little but hardship, in the Spring of 1542 a disillusioned DeSoto abandoned his quest and began a descent of the Mississippi River toward the Gulf of Mexico. DeSoto died on this journey and his body was committed to the Mississippi River at some point near the mouth of the Red River. The remnants of his party, over half of whom had died during the three-year ordeal, initially tried to reach outposts of Spanish civilization in northern Mexico by marching westward. This undertaking, which may have taken the survivors across part of St. Martin Parish, was subsequently abandoned in favor of returning to the Mississippi River, descending it to the Gulf of Mexico, and following the coast in crude vessels to Spanish civilization in Mexico (Fortier 1966:4-10).

The DeSoto expedition ended Spanish activity in Louisiana until the early eighteenth century. Renewed Spanish interest in the Lower Mississippi Valley was a response to the French colonization of Louisiana. French activity in this region was an extension of their colonial venture in the St. Lawrence River Valley. During the 1660s officials in New France developed a plan to ensure that they dominated the fur trade of the North American heartland. They envisioned a chain of forts and trading post on a broad arc from Quebec on the St. Lawrence, through the Great Lakes and Mississippi Valley, and terminating at a fortified trading post to be built near the mouth of the Mississippi River.

Chosen to investigate the feasibility of implementing this plan was Rene Robert Cavelier, Sieur de La Salle. The La Salle expedition departed from the vicinity of present-day Chicago in late December 1681. Four months later, having descended the Mississippi River, La Salle's party approached the Gulf of Mexico. On April 6, 1682, they reached the point where the river divided into three broad channels that flowed into the gulf. Having spent several days exploring the marshy coast surrounding the river's mouth, on April 9, 1682, La Salle assembled his party on a point of dry land a short distance above the river's mouth and claimed the Mississippi River's entire drainage basin for France (Parkman 1956:217-27). Two years later La Salle attempted to plant a colony near the mouth of the Mississippi. Misfortune plagued this expedition, and the colonization effort met a mystery-shrouded demise on the Texas coast.

The French did not lose interest in this project, but a war with the English understandably delayed renewed colonization. After the war ended in 1697, the French selected Pierre Le Moyne, Sieur de Iberville, to command a new

colonizing expedition. His fleet arrived off the gulf coast in late January 1699, and in mid-February he established a camp at Biloxi Bay. In early March an exploration party headed by Iberville and his brother, Jean-Baptiste Le Moyne, Sieur de Bienville, rediscovered the mouth of the Mississippi River and ascended the river as far as the Houma Indian villages located on the left bank of the river just above the mouth of the Red River (Fortier 1966:39).

Upon returning from this reconnaissance of the Mississippi River, Iberville selected a site on the eastern shore of Biloxi Bay for his colonial settlement. Here his party constructed Fort Maurepas. This post served as the center of the Louisiana venture for three years, but in 1702 the necessity of finding a location more conducive to agricultural pursuits prompted Iberville to move the settlement to a site just north of present-day Mobile, Alabama.

The Louisiana colony expanded slowly from its locus on the gulf coast, in no small part due to the fact that France was enmeshed in a series of intercolonial wars with Great Britain. During the first half of the eighteenth century this condition had little direct impact on Louisiana, except that the colonists were allowed a great deal of freedom to chart their own course. This situation would change abruptly as the fourth and final of the intercolonial wars, the French and Indian War or the Seven Years' War, recast the role of Louisiana on the stage of North American and international geopolitics. The most striking of these changes was that Louisiana, as a result of the French defeat, became a Spanish possession. By 1762 it was clear that the British would prevail in the current struggle and that France would lose its North American colonies in the peace negotiations. The Spanish, having participated briefly in the war as an ally of France, stood to lose their colonies of East and West Florida. Partly to compensate Spain for its losses and partly to limit the British territorial gains, in 1762, as preliminary negotiations to end the war were beginning, the French offered to cede Louisiana to Spain.

The Spanish were apprehensive about the expanding English presence in North America. Ominously, if Louisiana became a British possession the British Empire would share a common boundary with Mexico, the wealth from which was a vital cog in the Spanish economy. Eager to use Louisiana as a protective barrier, on November 3, 1762, by signing the Treaty of Fontainebleau, the Spanish obtained the colony from France.

With the signing of the Treaty of Paris of 1763 France ceded the remainder of its North American possessions to Great Britain. The Mississippi River north of Bayou Manchac became, therefore, an international boundary, as Louisiana became Spain's first line of defense for her more valuable colonies to the South and West.

This geopolitical transition coincided with the arrival in Louisiana between 1757 and 1770 of approximately 1,000 Acadians. One contingent of this migration, led by Joseph Broussard dit Beausoleil, arrived in New Orleans in February 1765. While Louisiana had already been ceded to Spanish by treaty, Spanish officials had yet to arrive in the colony to take over its government. Thus it fell to the French caretaker government headed by Governor Charles Philippe Aubry to facilitate the settlement of these immigrants.

The initial hope of the Broussard party was to settle on the right bank of the Mississippi River above New Orleans. The swampy nature of the terrain and the dense stands of hardwoods convinced the authorities that this plan was not feasible. Confronting this situation, they directed the Broussard immigrants to tracts of land belonging to Antoine Bernard Dauterive at the Attakapas settlement, approximately the site of present-day St. Martinville. The Acadians were to enter an arrangement similar to an indenture with Dauterive. They would furnish the labor on his cattle ranches for six years. In return they would receive half the herd's increase and title to land of their own at the end of the six-year term. As was frequently the case with frontier labor arrangements, the plan did not unfold as anticipated. Rather than congregate near the Attakapas post as the colonial officials had hoped, the Acadians dispersed in widely scattered and sometimes isolated family units stretching along the Bayou Teche and other waterways from near present-day Breaux Bridge, through St. Martinville, to near Loreauville. From these beginnings the Acadian influence and culture spread westward across the prairies of Southwestern Louisiana (Brasseaux 1987:74-76).

These Acadian settlers quickly developed a ranching commerce. This should not be surprising since better than three-quarters of them trace their origins to an area of Nova Scotia that had been a region of small cattle ranches (Brasseaux 1987:122). Throughout the remainder of eighteenth century their herds became a significant source of cattle for the expanding urban markets in New Orleans. This economic pattern became more prominent during the American Revolution as the Acadian cattlemen not only supplied New Orleans but the campaigns against Baton Rouge, Mobile, and Pensacola undertaken by Bernardo de Galvez as well (Brasseaux 1987:122-124).

The success of the American Revolution created new problems for the Spanish colonial government in Louisiana. Never able thoroughly to integrate the colony into its imperial system, Spanish officials felt threatened by America's rapid westward expansion. As the potential for conflict intensified along the international boundary, the Spanish desire to retain Louisiana waned. Thus they were receptive to French overtures for the return of Louisiana, and in 1800 the Treaty of San Ildefonso accomplished that fact.

Much to the dismay of the Spanish officials, barely three years later France sold Louisiana to the United States. Organized in 1804 as the Territory of Orleans, in 1812 that part of the Louisiana Purchase recognizable today at Louisiana became a state in the Union. These rapid changes in the political status of Louisiana had little immediate impact on St. Martin Parish. The area remained as it had been in latter years of the colonial period: a region of small Acadian settlements.

Although civil government existed in St. Martin Parish, its presence was not always felt during the antebellum period. Nothing better illustrates this fact than an episode of frontier-like criminal justice. By 1859 bands of marauding outlaws had overwhelmed the parish's legal system. In response to their depredations, groups of law-abiding parish residents formed committees of vigilance that pursued, detained, and dispensed summary justice to those believed guilty of participating in the wave of banditry. In their zeal to eradicate those whom they identified as criminals, the vigilantes took liberties of their

own that prompted protests from other residents. At this point the governor attempted to restore civil authority, but the vigilance committees rebuffed his representatives. Not until they felt confident that the lawless elements had been driven from the region did the committees disband and respect the authority of the civil offices (Perrin 1971:71-80).

On the heels of the vigilance turmoil, St. Martin Parish entered, along with the rest of the state, a period of political tension and crisis as the next eighteen months witnessed bitter political division, the election of Abraham Lincoln as President of the United States, secession, and the opening of the Civil War. The war brought economic dislocation and personal tragedy to Louisiana. Fortunately, St. Martin escaped the physical destruction that was visited upon areas like Port Hudson and Alexandria. Indeed, it was only during General Nathaniel Banks' Bayou Teche campaign in the Spring of 1863 that military action impinged on St. Martin Parish in any significant manner (Winter 1963:222-238).

Ironically, St. Martin Parish saw as much "action" during Reconstruction. The white residents of the parish accepted only grudgingly the Republican governments of Henry Clay Warmoth and William Pitt Kellogg. The gubernatorial election of 1872 witnessed a concerted effort statewide by white democrats to end Radical Republican government in Louisiana. In an election marked by corruption, fraud, and intimidation, both sides claimed victory, inaugurated their governor, and attempted to govern Louisiana. This stalemate continued until the threat of intensified military occupation stemming from the bloody Colfax Riot of Easter 1873 prompted the white democrats to acknowledge that their cause, the recognition of John McEnery as Louisiana's legitimate governor, had been lost.

White opposition to the Republican government did not disappear. In St. Martin Parish it took the form of a tax resistance movement led by Alcibiades DeBlanc. Facing the threat of having his administration's effectiveness destroyed by a lack of revenue, Governor Kellogg responded to this tax protest by ordering General A.S. Badger to lead a detachment of the Metropolitan Police, virtually a personal army responsible directly to the governor, to St. Martin Parish to restore order. In early May 1873 an armed clash occurred at St. Martinville between Badger's Metropolitan Police unit and the resistance members led by DeBlanc. While casualties on both sides were light, this skirmish aborted the potential insurrection in St. Martin Parish. The current of opposition to Republican government remained evident, however, throughout the remainder of Reconstruction (Taylor 1974:274-76). After Reconstruction St. Martin Parish returned to a way of life that changed very little until the discovery of petroleum and technological advances in air conditioning, communications, and transportation brought the outside world to south Louisiana.

Land Titles and Chain of Title

Determining chain-of-title for the survey area is difficult due to the incompleteness of the records, the fact that much of the land reverted to the state at different times at Sheriff's sales, and the fact that some of the land has been in dispute until recently. There is reason to believe that some of the present tenants, who claim ownership, are not, in fact, owners.

Briefly, the area in question is composed of four parcels, Nos. 42-55; 26-59; 34-70; and 24-17 (Assessor's Map Book).

The portion of the survey area in Sections 20 and 21 appears to have been held by Charles Hoyt, of Connecticut, and James Griffin in the early 1880s. A later reference (COB 49-417-25201) suggests that it came to Hoyt, at least, by patent. In any case, on April 5, 1881, Hoyt being absentee, the land was sold at a sheriff's auction to August Verret and Stephen Olivier (COB 38-17-16379; 16384). At least some of this land, in the NE 1/4 of Section 20, passed to the state for \$26.19 in taxes on July 24, 1902 (COB 58-299-29035). Part of the survey area, however, remained in the hands of Griffin and Hoyt, because in 1895, Mary Catherine Griffin, of Newark, New Jersey, bought from Charles Hoyt, who is listed as the patentee, and from Phoebe Hoyt, lands belonging to James Griffin and Charles Hoyt (COB 49-417-25201) in Fractional Section 21 (37 27/100 acres), in Fractional Section 17 (7 64/100 acres); and in the NW 1/4 of the NW 1/4 of Section 20 (36 acres).

That part of the area in the wedge-shaped southwestern portion of Section 17 seems, in the first part of the century, to have been sold to various buyers, for the 1957 ownership map in the Clerk of Court's Office shows it, from west to east, to have been owned by Oville Triche et al., Felix Daigle, and Mrs. Vernie (Emile) Voslin. The Triches lost the land for taxes in 1907, and Daigle is shown as having lost it at a tax sale in 1902 (Clerk of Court's Ownership Map 1957). A transaction in the conveyance record indicates that Felix Daigle lost 20 acres in "West Belle River," no township, range or section given, for \$4.17 taxes, on July 11, 1903 (COB 59-317-29779). That some of the land fronting the river was retained by him is clear, however, for on May 14, 1910, he sold to Sedonia Perque, husband of Mary Daigle, a piece of land in Fractional Section 17, fronting Belle River. This land was described as 260' and extending back wedge-shaped for 450', and bounded above by Daigle land and below by Cletus Mayou (COB 72-20-35004). What Sedonia Perque did with the land is unclear. What seems likely is that most or all of the land fronting Belle River, with the exception of a small frontage in the western part of Section 20, was owned by the state as the result of tax sales, off and on through most of this century, until the 1950s. The exception noted was in dispute by three groups of claimants, these being the Ernest W. Drackett succession (COB 1067-244-245323), the Nellie Price Graham succession (COB 1078-90-247400), and the Donald A. Dreibholz succession (COB 1077-401-2472-65). These various claimants settled the dispute amicably by agreement filed in the Clerk of Court's Office on October 13, 1977 (COB 758-357-180122). The remainder of the survey area was bought by Dow Chemical Co., in the late 1950s, when it was acquiring large tracts of land in the area, and was donated by it to the state on December 9, 1981, as a "qualified conservation contribution" (COB 862-195-204035). Consequently, with the exception of the land mentioned above, with three sets of former claimants, the survey area is shown today as belonging to the State of Louisiana (Assessor's Map).

Chapter 6. CULTURAL RESOURCES SURVEY

The following chapter describes the cultural resources survey of the Belle River Borrow Area.

This survey was, in essence, a search for historic and prehistoric remains. According to the scope of work, this was to be accomplished by examining the ground surface and placing small shovel tests at regular intervals across the project area. Transect lines were to be established at 20 m intervals with test pits dug every 50 m along these lines. Shovel testing was also to be done at any possible cultural feature not falling on a grid line. Any sites encountered were to be delineated, wherever possible, as to their size, probable cultural and temporal affiliation, and possible function and significance. For this particular project, special attention was to be paid to the banks of the Belle River and, where possible, the existing borrow pits.

As outlined in a previous section, the survey area contained several large borrow pits, and a stretch of land claimed by the Gros family. The presence of both the pits and the property had an impact on our ability to efficiently and effectively cover the project area.

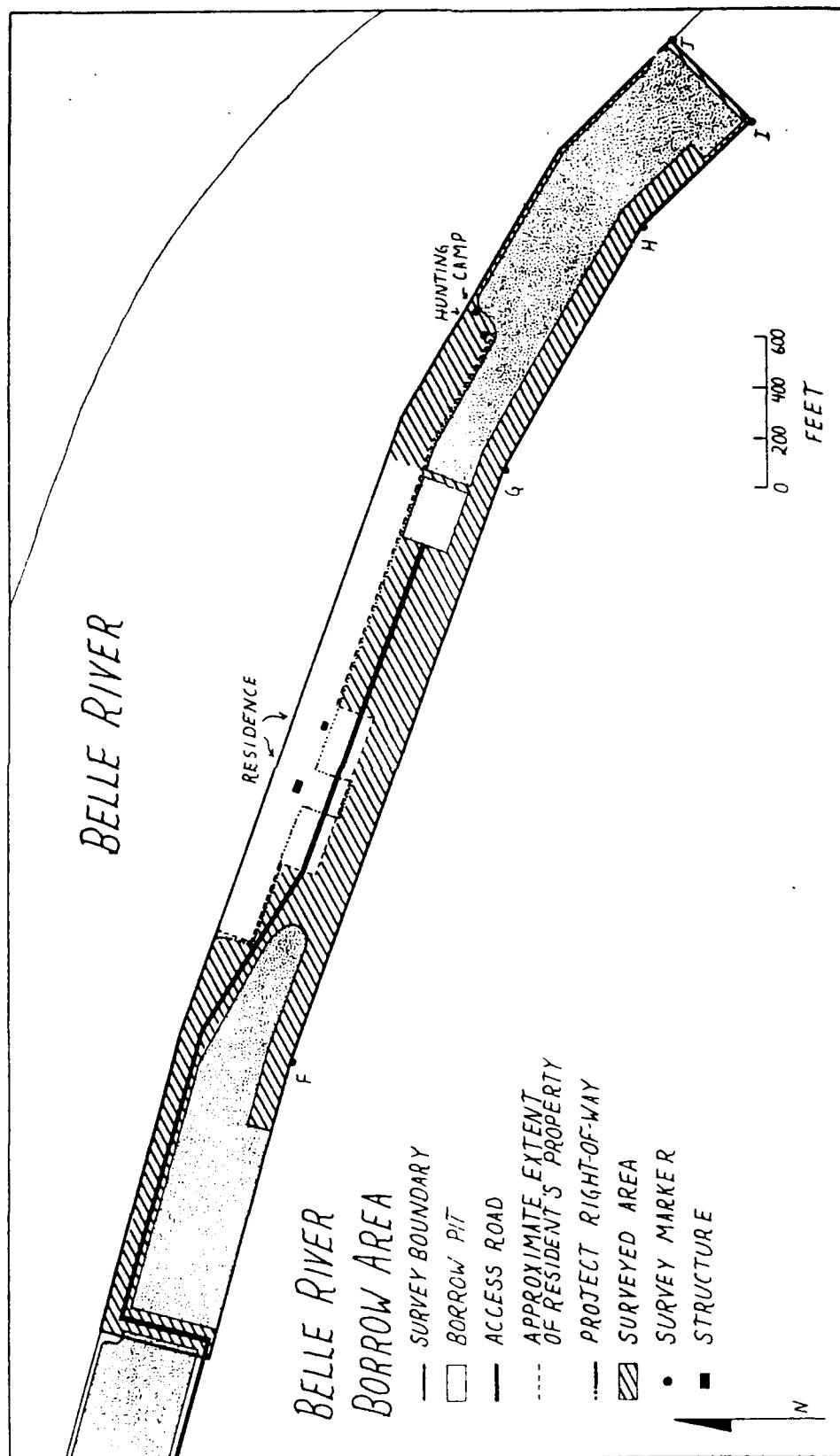
The effect of the borrow pits was primarily logistical. Their size necessitated that the adjacent ground be surveyed in uneven and isolated parcels. Also, the presence of spoil heaps or levees around the outside and deep water on the inside of pit edges precluded testing these banks for cultural materials.

The property occupied by the Gros family presented a slightly different problem. The survey was originally intended to cover the entire project corridor indicated in Figure 6, from the banks of the Belle River to the southern boundary line and including a parcel of land along the river outside of the project right-of-way (Figure 7). However, during the field investigations, the family questioned the survey team's right-of-entry onto the property. Following a series of communications with the family and the Corps of Engineers, the survey team was allowed to exclude from the survey those portions of land claimed by the Gros family that were outside of the project right-of-way (Figure 7).

With two exceptions, this arrangement was maintained. First, a small parcel at the eastern end of their land was surveyed prior to knowledge of the problem. Secondly, permission was obtained from Mrs. Gros to walk along the banks of the Belle River within their property lines; permission was not granted to do any subsurface testing (e.g. shovel testing, coring, etc.). This was done; given the confusion of the time, it seemed prudent to take advantage of the offer and yet not challenge the arrangement that had been made with them.

With these qualifications in mind, the remaining locations were surveyed (Figure 7). Slight modifications of the survey plan had to be implemented. Wherever possible, transect lines, running from east to west, were established at the recommended 20 m distance. However, in some of the uneven parcels of

Figure 7. Plan Map of the Surveyed Area.



land, this was not possible. Instead, lines were closer together, always being established along the southern and eastern borders of the survey area, on both sides of the access road, along the river bank, and immediately outside of the borrow pit spoil levees.

Figure 7 indicates the areas actually surveyed. These include:

1. All but 1065 feet (225 feet at the eastern end and 840 feet at the western end) of the southern border was covered by at least three transect lines. The eastern end was covered by two transect lines.
2. The western end of the survey area was walked on either side of the access road.
3. The northwestern quadrant was covered by three transect lines; along the bank, and on both sides of the road up to the property line.
4. The area between the western and eastern borrow pits, with a gap at the property, was covered by three transect lines.
5. The eastern and northern perimeters of the easternmost pit were walked in one or two transect lines.

The cultural resources encountered in the survey can be grouped into four categories: recent debris dumped or deposited along the river bank, debris redeposited along the sides of the access road, a burnt hunting camp dating from the 1950s or 1960s, and (prehistoric) shell deposits. Each will be discussed below.

Within a 10-15' strip along the entire 5500 feet of the Belle River can be found relatively recent (10-20 years) debris. This material has either been intentionally dumped, has washed up onto the river bank, or both. Items observed include but are not limited to styrofoam cups and other objects, cans and bottles of all sorts, plastic, rope and cordage, boards with nails, railroad ties, roofing materials including tar paper, plastic bags with peanuts, other miscellaneous wood items including driftwood, and tires.

Although deposition of such material may have increased in volume in recent years with increased settlement of the region, there is some evidence to suggest that this process has been an ongoing one. First, the degree of corrosion and degeneration of the material was such that extended weathering was indicated. Also, one shovel test pit uncovered a hot sauce bottle of a relatively new brand (+/- 10 years) about 10 cm below the ground surface. Another shovel test revealed a concentration of very rusted nails within a .5 m area under a thick organic, spanish moss mat.

As indicated in an earlier section of this report, much of the soil around the road has been redeposited, and many areas near the residence have been leveled off and filled in. In these disturbed areas, the soil was heavily mottled and oxidized in pockets. Occasionally, pieces of historic debris were uncovered by the shovel tests. In one location, about 325 feet from the northwestern corner of the survey area, between the borrow pit and the road, fragments of glass, brick, and ceramic were found buried no more than 20 cm below the surface. The debris was sparse, and limited to a 2 by 2 m area. Given the proximity to the road, and the heavily oxidized sediments, it was determined that the material had been redeposited.

Along the Belle River in the northeastern corner of the property claimed by the current residents is a burnt out hunting camp. Although no record of this camp was found in the Parish courthouse, a 150 by 150' plot on the project map corresponds with the remains encountered during the survey. In addition, the 1980 7.5 minute Quad map indicates a structure in the general area (Figure 1).

The remains of two structures were seen. One was a small wood and corrugated tin shed. The other was a hunting stand, only the wooden frame of which was left. Both structures measured about 6 by 10 feet. The shed was about 30 feet from the river while the stand directly bordered the borrow pit. Along the banks of the river were several large trash piles. The structures and the trash piles showed evidence of some burning.

The material found within the trash piles was mixed and included structural materials (e.g. boards and pipes), appliances, and domestic debris (e.g. dishes and glassware). All of the material, including the glassware and ceramics, appeared to date to within the last 25-35 years.

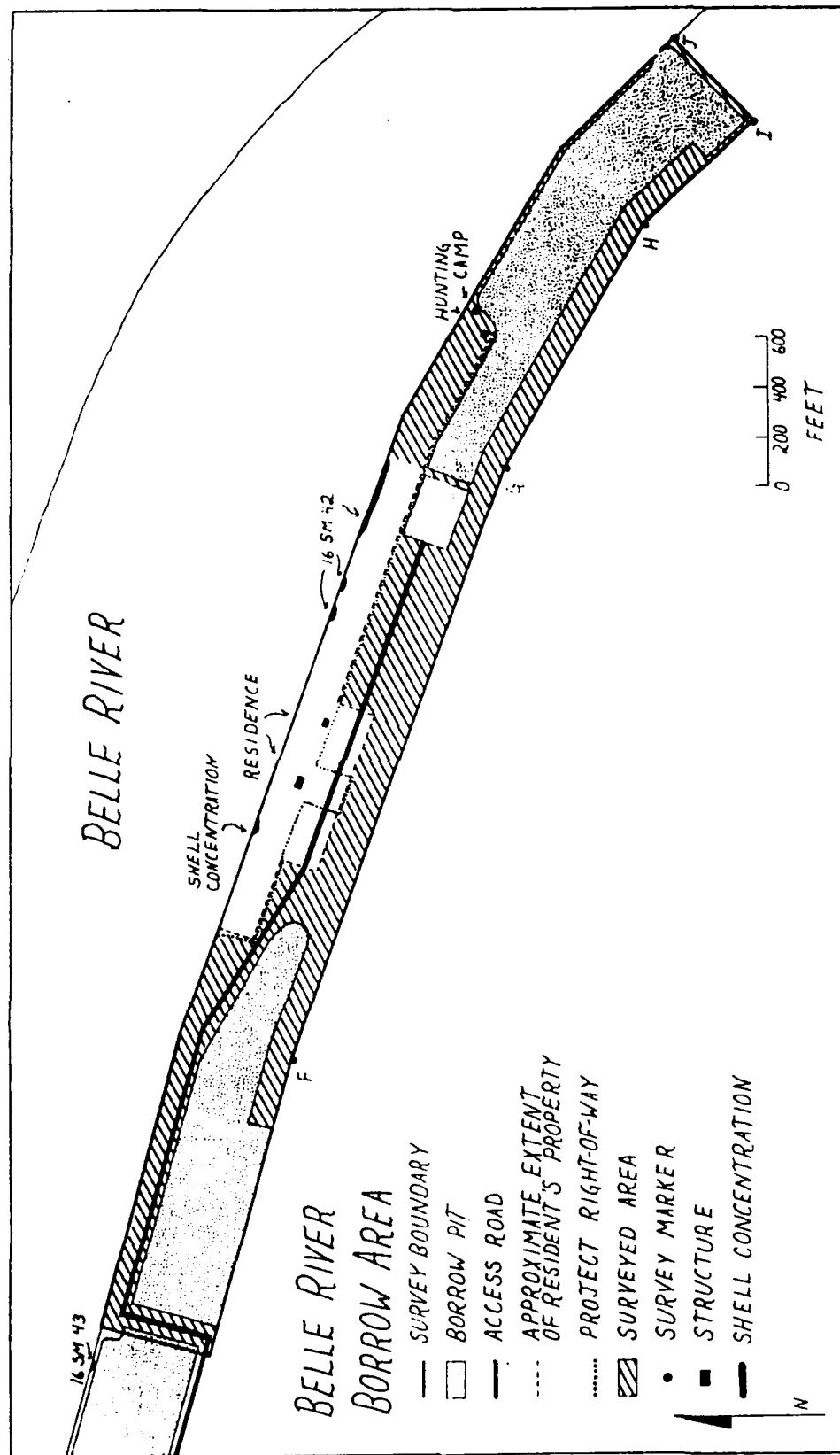
As indicated in an earlier section, two prehistoric shell middens were previously recorded on the western bank of the Belle River in or near the project area (Neuman and Servello 1976). Given the number of prehistoric sites within the region, it seemed possible that additional ones might be found along the river bank. The present survey was able to both relocate the known sites (16 SM 42, 16 SM 43) and record the presence of one additional possible site (Figure 8). Within the project area, SM 42, consisting of three discrete shell concentrations, and one other possibly prehistoric concentration, were identified. The second known site, SM 43, was found immediately outside of the project area and will be discussed in turn.

As outlined above, most of the river bank within the project area is claimed by the current residents. Again, permission was granted to walk this area but not to conduct any tests. Consequently, descriptions of cultural remains are necessarily limited to surface observations. Unfortunately, with the exception of SM 43, all four locations of (potentially) prehistoric remains recovered were located along this stretch of the Belle River.

These concentrations consisted primarily of Rangia shell; it was actually the shell that indicated the possible presence of a prehistoric site. Moving from west to east, the first shell concentration was fairly small (10 by 5 m) and was about 400 feet inside the property line. The remaining concentrations were located east of the occupied house. The first was about 9 by 5 m, about 1300 feet from the western property border. The second, 130 feet further east, measured approximately 8 by 3 m. Located 350 feet further was the last shell area. This extended for about 125 m along the river bank (Figure 8).

These locations shared several characteristics: only Rangia shell was noted; no other prehistoric materials were seen, recent debris was scattered across the shell; and the shell was not particularly dense but instead occurred in pockets. One location, the second from the west, was on a slightly raised area (+/- 1 m) above the surrounding surface. The rest of the shell scatters

Figure 8. Plan Map of Cultural Resources.



were flush with the ground surface and did not suggest any artificial construction.

Because of the circumstances, there are many questions that could not be answered with certainty. Most importantly, it is not clear whether all of the shell concentrations are in fact prehistoric shell middens. No clearly artifactual material was recovered. Also, it was not possible to discern whether the shell was in situ or had been recently redeposited through dredging or other activities.

These characteristics might argue against recognizing them as sites. Yet, many other sites in the region did not contain other artifacts. And, one of the three eastern locations, probably the easternmost one, is what had previously been recorded as SM 42. This concentration is the largest, the location relative to the mouth of Bayou Magazille is comparable, and the size makes it more easily seen by boat, the transportation utilized by the Neuman and Servello (1976) survey. Even though they did not find any prehistoric material other than shell, nor were they sure that the area was completely undisturbed, they were confident enough to record this as a site.

The present survey was neither able to support their claims nor strongly refute them. Consequently, in an effort to maintain consistency, it will be held that the area recorded as SM 42 is probably a site and, furthermore, that the two nearby shell concentrations are additional parts of the same site. The westernmost shell concentration was not previously recognized as a site; without that additional input, this survey will not recognize it as a site. Instead, its presence will be noted on the SM 42 and SM 43 site forms.

In summary, four shell concentrations were found within the survey area. Because they could not be tested, no evidence could be obtained to clearly identify them as sites or nonsites. Three were in close proximity to one another and will be considered part of the previously recorded SM 42. The fourth was not near a known site and will not be considered as such. All of these concentrations were located along the banks of the Belle River, well outside of the project right-of-way. Consequently, they will not be negatively impacted by additional borrowing activities within the project area.

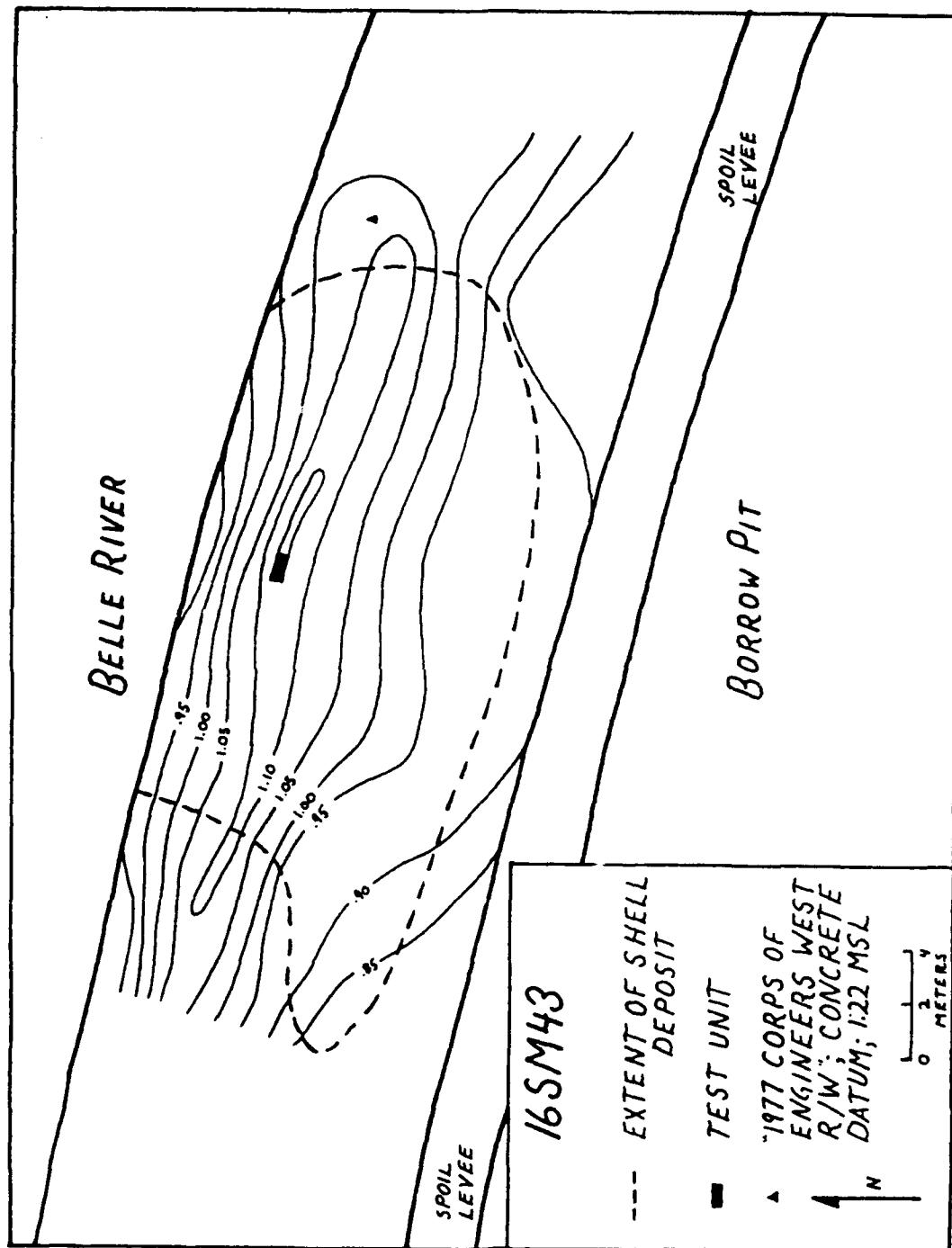
Just outside the northwestern corner of the project area, and north of the borrow pit, SM 43 was relocated by this survey. Because there were no constraints placed on our access, a few limited tests were conducted. The site was mapped, its boundaries delineated by a small corer, and one test pit was dug.

When SM 43 was first encountered it was characterized by a Rangia shell scatter on a slight topographic high covered with elephant's ear plants. Pockets of shell were observed across the high ground; no other prehistoric material was found (Figure 9). The surface material measured about 12 m wide for 20 m along the river bank. Subsurface cores indicated, however, that the deposit extended about 8 m westward beyond the surface manifestations (Figure 10). At the top of the high ground, the shell extended from the surface to a depth of between .20 and .30 m. In the lower areas, the shell was noted

Figure 9. Shell Deposit at 16 SM 43.



Figure 10. Contour Map of 16 SM 43.



between .20 and .40 m below the surface. The deposit appeared to be continuous, although sloping downward to the outer edges of the site.

One .5 x 1.0 m test pit was dug in an area with a high surface concentration of shell. The unit was excavated in two 10 cm levels; the sediments were screened through 1/4" mesh. In the first level, Rangia and oyster shell were recovered, as were a couple of pieces of glass and rusted nails. The Rangia was much more abundant than the oyster. With the exception of one whole Rangia, shells of both taxa were broken at least in half. The second level yielded only Rangia. At the base of the level, the soil became finer, more compact, less oxidized, and resembled undisturbed subsoil. Testing was halted at this point, at the absence of any indication of additional cultural debris.

Although no bone, pottery, or lithic material was found on the surface, or in the test pit, this is clearly a prehistoric site. First, Neuman and Servello (1976) did recover one piece of prehistoric pottery. Secondly, the presence of oyster, a saline-water taxon, not local to the area, indicates intentional cultural activity. In the absence of additional information, this survey can only confirm the interpretation offered by the previous investigation; this may have been a limited shellfish processing site for prehistoric groups. The area of the site is somewhat smaller than previously indicated. Because SM 43 is currently bounded by an extant borrow pit and the Bellas River, and is located outside of the project area, it will not be negatively impacted by the proposed additional borrowing activities.

The two sites examined by this survey (16 SM 42, 16 SM 43) are not at present eligible for National Register nomination. This is true for a couple of reasons. First, neither site has been well defined temporally or functionally. The aforementioned restricted access prevented subsurface, and thus cultural, assessment of SM 42. Limited tests of SM 43 did not yield any artifacts that could generate additional information about the cultural or temporal affiliation of this site. Consequently, there is no evidence that either site is unique or could uniquely contribute to the understanding of the region's past. As indicated in other studies (e.g. Gibson 1982c; Neuman and Servello 1976), more than 20 similar sites, many of which are better defined, have been recorded near the project area.

Chapter 7. SUMMARY AND CONCLUSIONS

The Museum of Geoscience conducted a survey of the Belle River Borrow Area, a 57 acre plot on the west bank of the Belle River in southern St. Martin Parish, Louisiana. Much of the landscape has been altered in recent years by previous borrowing activities and by the current residents. This survey located evidence of a range of cultural activities. The majority of these were relatively recent (within +/- 25 years) and represent redeposited, Euroamerican, trash. One abandoned hunting camp was recorded. Several ambiguous shell scatters were noted. Three of these may be part of one prehistoric site (16 SM 42). The previously recorded 16 SM 43 was relocated, and limited tests were conducted. Rangia and oyster shell were the only prehistoric materials recovered. None of these resources are particularly significant for understanding the past of this region and thus are not eligible for National Register nomination; none are unique or rare, many are not well defined, and none seems to be in danger of being negatively impacted by continued borrowing activites in the area.

REFERENCES CITED

- Adams, R. D., B. B. Barrett, J. H. Blackmon, B. W. Gane, and W. G. McIntire
1976 Barataria Basin: Geologic Processes and Framework. Louisiana State University, Center for Wetland Resources, Sea Grant Publication No. LSU-T-76-006. Baton Rouge.
- Brasseaux, C. A.
1987 The Founding of New Acadia: The Beginnings of Acadian Life in Louisiana, 1765-1803. Louisiana State University Press, Baton Rouge.
- Brown, D. A., V. E. Nash, A. G. Caldwell, L. J. Bartelli, R. C. Carter, and O. R. Carter
1970 A Monograph of the Soils of the Southern Mississippi River Alluvium. University of Arkansas, Agricultural Experiment Station, Fayetteville, Southern Cooperative Bulletin 178.
- Byrd, K., and R. W. Neuman
1978 Archaeological Data Relative to Prehistoric Subsistence in the Lower Mississippi River Alluvial Valley. Geoscience and Man 19:9-21.
- Coleman, J. M.
1966 Ecological Changes in a Massive Fresh-Water Clay Sequence. Transactions of the Gulf Coast Association of Geological Societies 16:159-174.
- Elliot, D. O.
1932 The Improvement of the Lower Mississippi River for Flood Control and Navigation. U. S. Army Waterways Experiment Station, Vicksburg, Mississippi.
- Fisk, H. N.
1944 Geological Investigation of the Alluvial Valley of the Lower Mississippi River. Mississippi River Commission, U. S. Army Corps of Engineers, Vicksburg, Mississippi.
1947 Fine-Grained Alluvial Deposits and their Effects on Mississippi River Activity. Mississippi River Commission, U. S. Army Corps of Engineers, Vicksburg, Mississippi.
1952 Geological Investigation of the Atchafalaya Basin and the Problem of the Mississippi River Diversion. Mississippi River Commission, U. S. Army Corps of Engineers, Vicksburg, Mississippi.
- Ford, J. A.
1951 Greenhouse: A Troyville-Coles Creek Period Site in Avoyelles Parish. American Museum of Natural History, Anthropological Papers 44(1). New York.
- Ford, J. A., and G. R. Willey
1940 Crooks Ste. A Marksville Period Burial Mound in LaSalle Parish.

Louisiana. Department of Conservation, Louisiana Geological Survey, Anthropological Study 3. New Orleans.

Fortier, A.

- 1966 A History of Louisiana. I. Early Explorers and the Domination of the French. 1512-1768 (Second Edition). Claitor's, Baton Rouge.

Frazier, D. E.

- 1967 Recent Deltaic Deposits of the Mississippi River: Their Chronology and Development. Transactions of the Gulf Coast Association of Geological Sciences 17:287-315.

Gagliano, S. M.

- 1963 A Survey of Preceramic Occupations in Portions of South Louisiana and South Mississippi. Florida Anthropologist 16(4):105-131.

Gibson, J. L., editor

- 1982a The Troyville-Baytown Period in Lower Mississippi Valley Prehistory: A Memorial to Robert Stuart Neitzel. Louisiana Archaeology 9.

Gibson, J. L.

- 1982b The Troyville-Baytown Issue. In The Troyville Baytown Period in Lower Mississippi Valley Prehistory: A Memorial to Robert Stuart Neitzel, edited by J. L. Gibson, pp.29-62. Louisiana Archaeology 9.

- 1982c Archaeology and Ethnology on the Edges of the Atchafalaya Basin, South Central Louisiana. Final Report Submitted to the U. S. Army Corps of Engineers, New Orleans District.

Gornitz, W., S. Lebedeff, and J. Hansen

- 1982 Global Sea Level Trend in the Past Century. Science 215:1611-1614.

Greengo, R. E.

- 1964 Issequena: An Archaeological Phase in the Yazoo Basin of the Lower Mississippi Valley. Society for American Archaeology Memoirs 18.

Haag, W. G.

- 1971 Louisiana in North American Prehistory. Museum of Geoscience Melanges 1. Louisiana State University, Baton Rouge.

Kniffen, F. B.

- 1936 A Preliminary Report on the Indian Mounds and Middens of Plaquemines and St. Bernard Parishes. In Lower Mississippi River Delta: Reports on the Geology of Plaquemines and St. Bernard Parishes. Department of Conservation, Louisiana Geological Survey, Geological Bulletin 8:407-422. New Orleans.

- 1938 The Indian Mounds of Iberville Parish. In Geology of Iberville and Ascension Parishes. Department of Conservation, Louisiana Geological Survey, Geological Bulletin 13:189-208. New Orleans.

- 1968 Louisiana, its Land and People. Louisiana State University Press, Baton Rouge.
- Kniffen, F. B., H. F. Gregory, and G. A. Stokes
1987 The Historic Indian Tribes of Louisiana from 1542 to Present. Louisiana State University Press, Baton Rouge.
- Kolb, C. R.
1958 Geologic Investigation of the Mississippi River Gulf Outlet Channel. U. S. Army Corps of Engineers Waterways Experiment Station, Miscellaneous Paper 3-259. Vicksburg, Mississippi.
- Kolb, C. R., and J. R. van Lopik
1958 Geology of the Mississippi River Deltaic Plain, Southeastern Louisiana. U. S. Army Corps of Engineers Waterways Experiment Station, Technical Report 3-483. Vicksburg, Mississippi.
- Kreitler, C. W.
1977 Fault Control of Subsidence. Ground Water 15:203-214.
- Krinitzsky, E. L., and F. L. Smith
1969 Geology of the Backswamp Deposits in the Atchafalaya Basin, Louisiana. U. S. Army Corps of Engineers Waterways Experiment Station, Technical Report S-69-8. Vicksburg, Mississippi.
- May, J. R., and L. D. Britsch
1987 Geological Investigation of the Mississippi River Deltaic Plain: Land Loss and Accretion. U. S. Army Corps of Engineers Waterways Experiment Station, Technical Report GL-87-13. Vicksburg, Mississippi.
- McIntire, W. G.
1958 Prehistoric Indian Settlements of the Changing Mississippi River Delta. Louisiana State University Press, Baton Rouge.
- Meltzer, D.
1988 Late Pleistocene Human Adaptations in Eastern North America. Journal of World Prehistory 2:1-52.
- Moore, C. B.
1913 Some Aboriginal Sites in Louisiana and Arkansas. Journal of the Academy of Natural Sciences of Philadelphia 16.
- Morgan, J. P.
1973 Impact of Subsidence and Erosion of Louisiana Coastal Marshes and Estuaries. In Coastal Marsh and Estuary Management--A Symposium edited by R. H. Chabreck, pp. 217-233. Louisiana State University, Division of Continuing Education, Baton Rouge.
- Morgan, J. P., and P. B. Larimore
1957 Changes in the Louisiana Shoreline. Transactions of the Gulf Coast Association of Geological Societies 7:303-310.

- Neuman, R. W.
1984 An Introduction to Louisiana Archaeology. Louisiana State University Press, Baton Rouge.
- Neuman, R. W., and A. F. Servello
1976 Atchafalaya Basin Archaeological Survey. Final Report Submitted to the U. S. Army Corps of Engineers, New Orleans District.
- Nummendal, D.
1983 Rates and Frequencies of Sea Level Changes: A Review with an Approach to Predict Future Sea Levels in Louisiana. Transactions of the Gulf Coast Association of Geological Societies 33:361-366.
- Parkman, F.
1956 The Discovery of the Great West: LaSalle. Holt, Rinehart and Winston, New York.
- Penland, S., and R. Boyd, editors
1985 Transgressive Depositional Environments of the Mississippi River Delta Plain. Louisiana Geological Survey Guidebook Series 3. Baton Rouge.
- Perrin, W. H., editor
1971 Southwest Louisiana Biographical and Historical Atlas. Claitor's, Baton Rouge.
- Phillips, P.
1970 Archaeological Survey in the Lower Yazoo Basin, Mississippi, 1949-1955. Peabody Museum of Archaeology and Ethnology Papers 60. Cambridge.
- Ramenofsky, A. F.
1986 The Persistence of Late Archaic Subsistence-Settlement in Louisiana. In Foraging, Collecting, and Harvesting: Archaic Period Subistence and Settlement in the Eastern Woodlands, edited by S. W. Neusius, pp. 289-312. Southern Illinois University at Carbondale Center for Archaeological Investigations Occasional Paper 6.
1987 Vectors of Death. University of New Mexico Press, Albuquerque.
- Ramenofsky, A. F., and A. M. Mires
1985 The Archaeology of Cowpen Slough, 16CT147. Final Report Submitted to the Louisiana State Division of Archaeology, Baton Rouge.
- Roberts, H. H.
1985 A Study of Sedimentation and Subsidence in the South-Central Coastal Plain of Louisiana. Summary Report to the U. S. Army Corps of Engineers, New Orleans District.

- Saucier, R. T.
- 1963 Recent Geomorphic History of the Pontchartrain. Louisiana State University Coastal Studies Series 9. Baton Rouge.
- 1974 Quaternary Geology of the Lower Mississippi Valley. Arkansas Archeological Survey, Research Series 6. Fayetteville.
- Shenkel, R.
- 1984 Early Woodland in Coastal Louisiana. In Perspectives on Gulf Coast Prehistory, edited by D. D. Davis. University of Florida Press, Gainesville.
- Smith, L. M., J. B. Dunbar, and L. D. Britsch
- 1986 Geomorphological Investigation of the Atchafalaya Basin, Area West, Atchafalaya Delta, and Terrebonne Marsh. U. S. Army Corps of Engineers Geotechnical Laboratory, Technical Report GL-86-3.
- Springer, J. W.
- 1972 Environmental Change and Prehistoric Settlement on the Coast of Louisiana. Southeastern Archaeological Conference Bulletin 15:1-10.
- Taylor, J. G.
- 1974 Louisiana Reconstructed 1863-1877. Louisiana State University Press, Baton Rouge.
- Terzaghi, K.
- 1943 Theoretical Soil Mechanics. Wiley, New York.
- U. S. Army Corps of Engineers
- 1974 Atchafalaya Basin Floodway, Louisiana: Preliminary Draft, Environmental Statement. U. S. Army Corps of Engineers, New Orleans District.
- U. S. Department of Agriculture
- 1977 Soil Survey of St. Martin Parish, Louisiana. Fort Worth, Texas.
- 1982 Soil Survey of Pointe Coupee and West Baton Rouge Parishes, Louisiana. Fort Worth, Texas.
- Webb, C. H.
- 1982 The Poverty Point Culture (Second Edition, Revised). Geoscience and Man 17. Baton Rouge.
- Williams, S. and J. P. Brain
- 1984 Excavations at the Lake George Site, Yazoo County, Mississippi, 1958-1960. Peabody Museum of Archaeology and Ethnology, Papers 74. Cambridge.

Winter, J. D.
1963 The Civil War in Louisiana. Louisiana State University Press, Baton Rouge.

Other Sources Cited:

Division of Archaeology Site Files (Baton Rouge)
Clerk of Court Records, St. Martin Parish
Assessor's Records, St. Martin Parish